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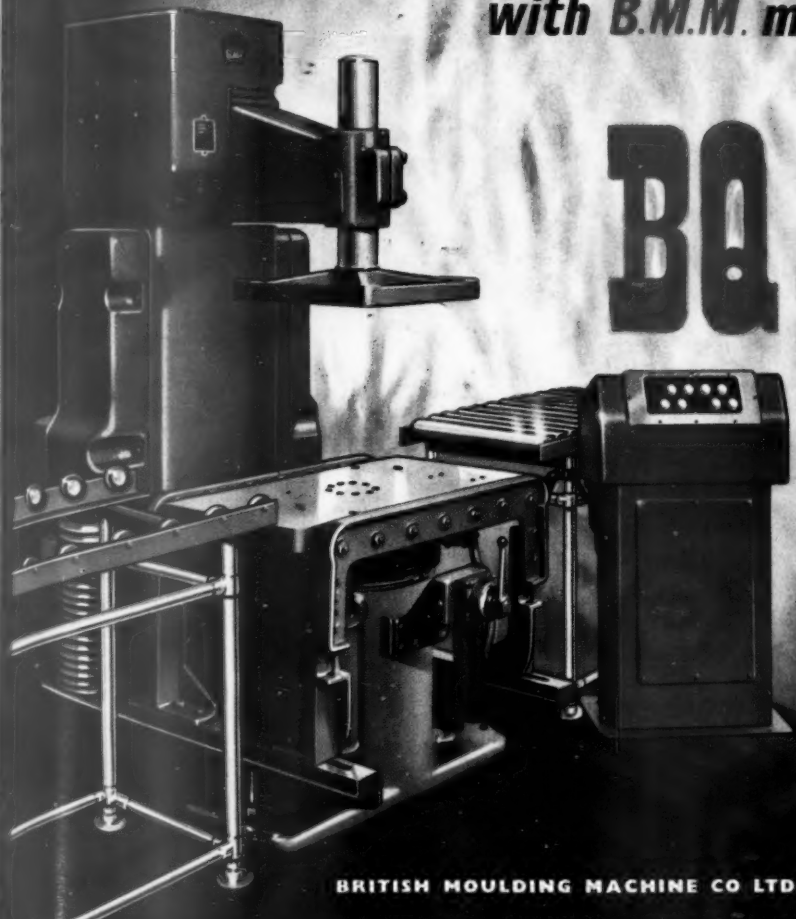

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PRINCIPAL CONTENTS

Page

Study of Non-metallic Inclusions in Castings, Using a Radioactive Tracer

By B. B. Gulyaev and Others

In this abstract from a paper originally published in the Soviet periodical *Liteinoe Proizvodstvo*, the authors describe an experimental procedure for studying non-metallic inclusions in castings. The method is the incorporation in the moulding mixture of a tungsten isotope, and the data obtained by this means are here presented 341

American Society for Testing Materials

Report on the annual general meeting held in Boston 345

St. Albans Diecasters, Limited

Engineering & Lighting Company, Limited, develop their new subsidiary 349

Etude d'Inclusions non-metalliques dans les Coulées par Radio-Isotopes. Par B. B. Gulyaev et autres.
Dans cet extrait d'un article publié à l'origine dans la revue soviétique Liteinoe Proizvodstvo, les auteurs décrivent une procédure expérimentale pour l'étude des inclusions non-metalliques dans les coulées. La méthode consiste à incorporer dans la mélange de moulage un isotope de tungstène et les informations obenues par ce moyen y sont résumées 341

American Society for Testing Materials.
Rapport sur la réunion générale annuelle de la Société américaine pour éprouver les qualités des matériaux, qui s'est tenue à Boston. 345

St. Albans Diecasters, Limited.
Engineering & Lighting Company, Limited, developpent leur nouvelle compagnie succursale. 349

Untersuchung von nichtmetallischen Einschlüssen in Gussteilen mit Hilfe von Radioisotopen. Von B. B. Gulyaev und anderen.
In diesem Auszug aus einem ursprünglich in der Sowjetrussischen Zeitschrift "Liteinoe Proizvodstvo" veröffentlichten Artikel beschreiben die Verfasser ein versuchsweises Verfahren, zum Studium nichtmetallischer Einschlüsse in Abgüssen. Diese Methode besteht darin, dem Formmaterial eine Wolfram-Isotope einzuverleiben und die so erhaltenen Resultate werden hier zusammenfassend dargestellt. 341

American Society for Testing Materials.
Bericht über die in Boston abgehaltene Jahrestagung der amerikanischen Materialprüfungsgesellschaft. 345

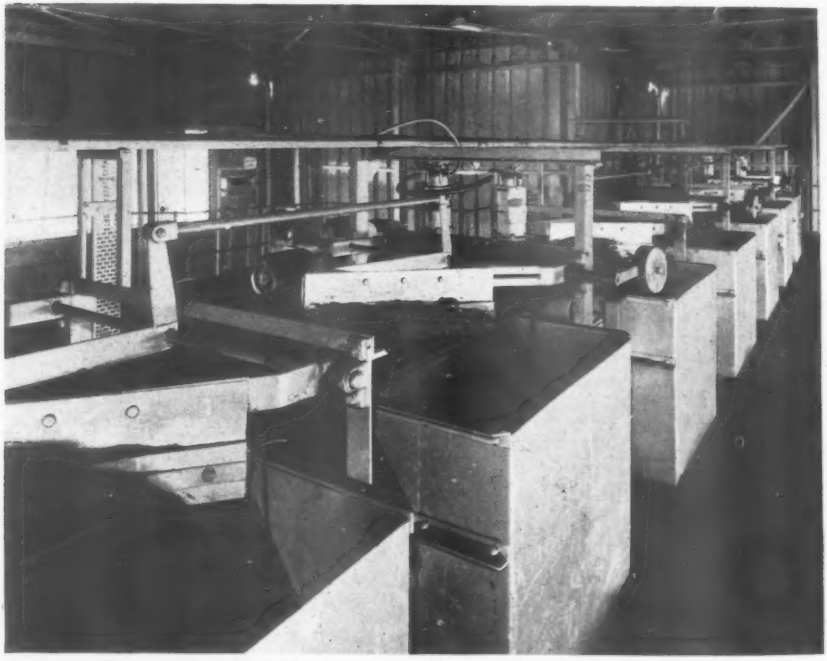
St. Albans Diecasters, Limited.
Engineering & Lighting Company, Limited, entwickeln ihre neue Tochtergesellschaft. 349

Features, News, Commercial Information and Statistics

Leader: A Warning 339
K & L at Halstead 340
Company News 348
EFCO Increases Profits 348
New Share Issue Mooted for Broken Hill 348
No Ordinary Dividend by Hurst, Nelson 348
Tata Iron & Steel Profits Decline 348
Swiss Art Castings Imported 352
Equipment and Supplies 353
Publications Received 355
News in Brief 357
Personal 360
Forthcoming Events 361
Contracts Open 361
Raw Material Markets 362
Current Prices of Iron, Steel and Non-ferrous Metals 364
Pig-iron and Steel Production 366

Modern Foundry Plant for BATH MAKING

Photograph shows : Belt conveyor with automatic plough arrangement for ploughing off reconditioned moulding sand into large storage hoppers



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FOUNDRY
TRADE JOURNAL

Vol. 105 SEPTEMBER 18, 1958 No. 2188

A Warning

Towards the end of November, we understand an application is being made to the Comptroller General of Her Majesty's Patent Office for the reinstatement of a lapsed Patent granted to a Czech Nationalized Corporation. The Patent related to the making of castings by the CO_2 Process. It has come to our knowledge that if this reinstatement be granted, then the Patent will be acquired by a British concern and thereafter it may well be anticipated that conditions will be attached to the use of the Process by some form of licensing. This could involve either money payments or restriction as to freedom of purchase of the two main raw materials—silicate of soda and CO_2 gas.

For the last five years, the CO_2 Process has been freely available to the foundry industry and great strides have been made. The consumption of silicate of soda has risen from virtually zero to the imposing figure of the order of 8,000 tons a year. During this period, a vast amount of research has been undertaken, both by the well-known supply houses and the actual foundries. The literature which has been published and made so universally available is recognized everywhere as being unsurpassed for its technical quality and outstanding worth. Its volume is indeed impressive and includes records of both successes and failures—a British democratic system which ensures the evolution of the finest type of " know-how." In this field it is no exaggeration to assert that this country leads the world.

The British foundry industry will not enjoy the prospect of a future involving the loss of freedom of action, such as they have had for the last five years. Founders will rightly fear that progress will be arrested and foundries, not up to now using the process, will hesitate to undertake experiments. We strongly advise the various employers' associations to acquaint themselves with the facts of the case and take all possible steps to safeguard the interests of the individual foundries.

Anglo/Dutch Trade Council

It is not always realized that Holland is Britain's sixth largest export market, coming after only four Commonwealth countries and the USA. She is by a considerable margin the UK's biggest customer in Europe: in 1957, Holland bought about £120,000,000 worth of British goods, although this in itself represents only about eight per cent. of her total imports, and imports from Germany were well over double the United Kingdom figure. There has been a Dutch Chamber of Commerce in London since 1890, but until now there has been no similar British organization in Holland. To fill this need, therefore, the Federation of British Industries and the Association of British Chambers of Commerce decided to form a new body to foster Anglo/Dutch trade. This body, which opens to-day (September 18), is the Anglo/Dutch Trade Council, with headquarters at 99, Jan Van Nassaustraat, The Hague, Holland. Apart from its importance as a market for British goods, Holland is bound to play an increasingly important role in British trade with the advent of the Common Market and ultimately of a Free Trade Area, and the Council is expected to play a prominent part in these developments.

H.M. Ambassador in the Hague, H. E. Sir Paul Mason, K.C.M.G., K.C.V.O., has consented to become the Council's honorary president, and the chairmen of this new venture are Mr. Duncan Oppenheim, chairman of the British-American Tobacco Company, and Dr. Paul Rykens, lately chairman of Unilever N.V. of Holland. Twenty leading British and Dutch businessmen have been appointed to the General Council.

IBF—East Anglian Section

The 1958-9 session of the East Anglian section of the Institute of British Foundrymen commences on Tuesday, October 21, with a visit in the afternoon to the foundry and works of Lake & Elliot, Limited, Braintree. This is to be followed (in the evening, at 7.15 p.m.) by a meeting in the company's Pavilion, for the induction of the new president, Mr. A. M. Whipp, who will then deliver his address.

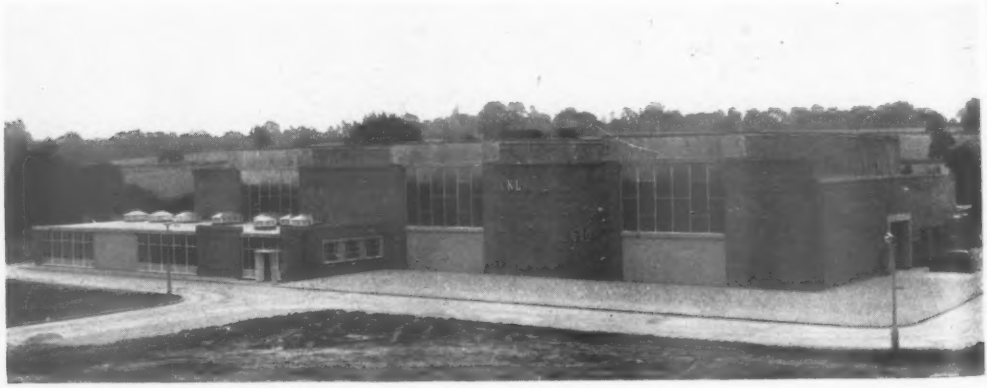
Members wishing to participate in the works visit should obtain and return their application forms to the secretary, Mr. H. A. Wincer, Ransomes, Sims & Jefferies, Limited, Nacton Foundry, Ipswich, Suffolk, not later than October 10. Members and guests are invited to attend the evening meeting whether or not they are able to participate in the afternoon visit.

K & L at Halstead

In the JOURNAL of March 27 this year, an account was published of the new fettling department, which K & L Steelfounders and Engineers, Limited, were building at Colchester Road, Halstead, Essex. This building has now been completed (see illustration below) and was formally opened last Saturday by the Rt. Hon. R. A. Butler, C.H., M.P., Lord Privy Seal, in whose constituency the town of Halstead lies. Speaking before using the special key to open the front door, Mr. Butler referred in quite glowing terms to the activities of the "600" Group of Companies (of which K & L is a member) and said how pleasing it was to him that extra employment was being offered in Halstead in premises so admirably constructed. He also commented—apropos of employment—about his gratification on learning that K & L, in the event of any redundancy arising, gave a week's notice to employees for each year of service with the company.

The new building is impressive both outside and inside—where spaciousness, good lighting and careful attention to the provision of services (dust-extraction, compressed air, power, and so on) are immediately apparent. Last Saturday also served as an "open day," in that local civic authorities, townspeople, many of the firm's employees from Letchworth, representatives of the Press, neighbouring firms, contractors, etc., were invited to inspect the plant. The ladies among the guests were particularly astounded by the high quality of the washing, showerbath and clothes-locker accommodation provided at the new works. The firm's project is to transport castings, after shotblasting and removal of runners and heads, by road lorry from its Letchworth steel foundry to the Halstead works for final dressing operations. The same lorries will take back finished work for despatch from Letchworth. The basic idea is to remove a "bottleneck" (from the production standpoint) at Letchworth and make use of labour available locally at Halstead—a total of 100 personnel has been mentioned.

(Equipment is still being installed in the new premises and when a more advanced stage is reached it is proposed to publish details in the JOURNAL.)



Study of Non-metallic Inclusions in Castings, Using a Radioactive Tracer*

By B. B. Gulyaev and Others

The study of the formation in castings of non-metallic impurities is of sufficient importance for the utilization of a new experimental procedure, as described in what follows, to be of immediate interest to foundrymen. The method employed in the tests here commented upon is the incorporation of a radioactive tracer in the moulding mixture. The resultant radiographs reveal fresh data on the formation of such inclusions, and the authors' conclusion is that the radioactive tracer method may be a useful tool for further investigation.

Impurities (non-metallic inclusions) are a type of defect frequently encountered in steel and iron castings. Their formation may often be due to the following causes; erosion of the mould walls by liquid metal; entrainment of ladle slag in the stream of metal; accidental occlusion of dross while pouring, or damage to the mould during assembly. It is important to know the origin of the formation of these impurities in order to overcome the difficulties to which they give rise. Up to the present day, mould erosion has never been experienced while dealing with the straight channels of the gating system. It is known that in the absence of a slag trap in gating systems the amount of inclusions increases, but the cause of this phenomenon is not completely understood. Some authorities say that the slag traps act as collectors of accidentally entrained dross, others consider their function to be the softening of the impact caused by the change of direction of the gates. Until now the ways in which the non-metallic inclusions are carried during the mould-filling process have not been studied.

Testing Procedure

There is now the possibility of using a radioactive tracer in the study of these problems, and the results of investigations using this technique on the formation of non-metallic inclusions due to mould erosion of the gating system, or to the entrainment of dross in the stream of poured metal, will be discussed in what follows.

Radioactive tracer was incorporated in the moulding mixture. The tungsten isotope W 185 emitting β- and γ-radiation was employed for this purpose. The choice of this isotope was indicated by its convenient half-life of 74 days, and also by its considerable powers of penetration, *i.e.*, beta rays (0.43 Mv); and gamma rays (0.134 Mv). It was estimated that an 0.15 mm. layer of steel will absorb completely the β-radiation of W 185, but the much more penetrative γ-radiation is completely absorbed only by a 6 mm. layer. Consequently the useful range of the impurities containing the tracer element is limited to the surface layer only.

* Translated from the Soviet periodical *Liteinoe Proizvodstvo* 1956 (8) Aug. 25-27, and made available by courtesy of the British Steel Castings Research Association.

Moulding Mixture

The moulding mixture containing the radioactive isotope was prepared in a glass container. To obtain uniform distribution the radioactive material was introduced in the form of an aqueous suspension and the composition was mixed thoroughly for 15 to 20 min. The amount of tungsten isotope introduced was 15 per 100 gm. of the moulding mixture. The most dangerous parts of the mould from the erosion point of view appear to be the gates, since the linear velocity of metal flow therein is greater than that in the mould cavity itself.

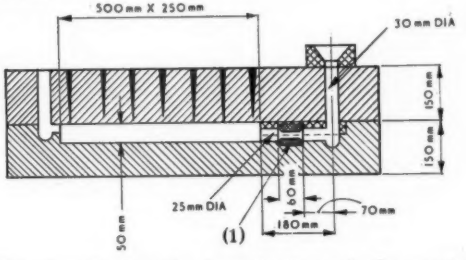


FIG. 1.—*During the investigation of the erosive action of liquid steel, or iron, on gating walls, in the test-moulds prepared the horizontal portions of the gates incorporated core inserts made from a moulding mixture containing radioactive material—such an insert can be seen at* (1).

Investigation of the erosive action of liquid steel on the gating walls was carried out in clay-bonded sand moulds and the horizontal portions of the gates incorporated core inserts made from a moulding mixture containing radioactive material, as can be seen in Fig. 1, where (1) illustrates such a core insert. The effect of pouring temperature and binders was also studied.

Preparation of Cores

Cores were prepared from green-sand, oil and water-glass bonded moulding mixtures (Table 1). Cores made in sand/clay mixtures were kept in a sealed container until the mould was assembled, to

TABLE 1.—*Composition and Characteristics of Three Core-sand Mixtures.*

Type of mixture.	Composition per cent., by weight.							Friability in weight, per cent.
	Quartz Sand 50/100.	Clay.	Waterglass.	10 per cent. solution of NaOH.	Mazut (pitch)	Drying oil.	Moisture.	
Green-sand/Clay	90	10	—	—	—	—	5.5	2.0
Water-glass	95	5	6	1	0.5	—	4	0.2
Oil-sand	96	4	—	—	—	4	—	0.2

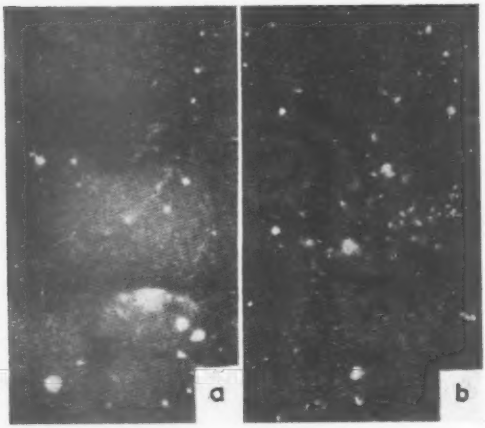
avoid them becoming friable; cores made in water-glass and oil-bonded mixtures were dried in an oven at 180 deg. C. to 200 deg. C. for a period of 1.5 to 2 hr.

Castings

Steel of the type 35L,* employed in these investigations, was melted in a 500-kg. induction furnace. Liquid-metal temperature was determined by means of a Pt-Pt/Rh thermocouple immersed in the ladle before pouring. Castings were made in the form of plates 500 by 250 by 50 mm. Inclusions carried into the mould cavity as a result of erosion of the core inserts containing the tracer element were located by means of X-ray films applied to the surface of the castings. After cooling in the mould, the castings were separated from the adherent moulding mixture. Radiographs were obtained employing X-ray film of the XX type, enclosed in a light-proof paper case. Time of exposure was 5 to 7 days. The films received the usual photographic processing. Fig. 2 shows radiographs of surfaces of castings poured through cores prepared from sand/clay mixtures, at 1,510 deg. C. (Fig. 2 (*a*)), and 1,600 deg. C. (Fig. 2 (*b*)). At the pouring temperature of 1,600 deg. C. the amount of inclusions increased considerably since the superheated metal, having an intimate contact with walls of the mould, eroded these intensely by a process of solid skin formation.

* See footnote on page 344.

FIG. 2.—*Radiographs of the surfaces of castings which were poured through sand/clay-mixture cores at* (*a*) 1,510 *deg. C., and* (*b*) 1,600 *deg. C.*



Results and Conclusions

Fig. 3 shows the radiographs of surfaces of castings which were poured through core inserts made of various moulding mixtures. The greatest amount of inclusions occurred when cores prepared from green-sand/clay mixture were used (Fig. 3 (*a*)); the amount of inclusions decreased when cores prepared from a mixture containing water-glass were employed (Fig. 3 (*b*)); a further drop in the amount of inclusions occurred with oil-bonded cores (Fig. 3 (*c*)). Evidently the varying erosion of moulding mixtures is related to the surface strength of the cores in the period of contact with the liquid metal; this strength is approximately indicated by the friability index of the moulding mixtures obtained at normal temperatures (Table 1). The force required to pull sand grains from the surface of the mould increases with the strength of the moulding mixture.

To study the erosion of the sprue in green-sand moulds, an insert incorporating a radioactive material was used so as to form the base of the sprue

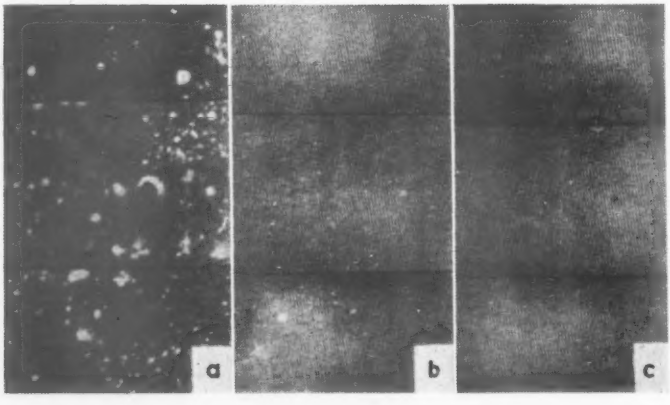


FIG. 3.—*Radiographs of the surfaces of castings which were poured through core inserts made from various moulding mixtures,* (*a*) *green-sand/clay,* (*b*) *water-glass and* (*c*) *oil-bonded.*

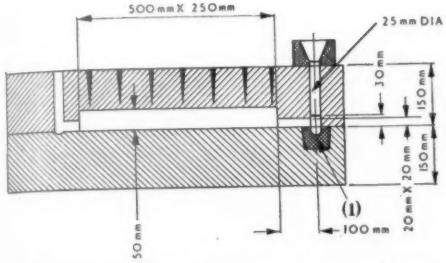


FIG. 4.—*Cross-section through a test mould incorporating a radioactive insert, used to study the erosion of the sprue in green-sand moulds. The insert can be seen at* (1).

consequently, to reduce the amount of inclusions in the surface regions of the plate. The best results are obtained with gating systems employing the deep semi-spheroidal sprue bases. Higher ramming density also decreases considerably the erosion of mould walls. Vertical sections of the castings show that inclusions concentrate in the vicinity of the top surface. Near the bottom surfaces a small number of fine inclusions, washed away from the surfaces of the gating channels, are present. Obviously these inclusions have not succeeded in rising to the top and remain occluded in the crust of the solidifying bottom surface.

The investigations made demonstrate that at sufficiently-high metal temperature and low strength of the moulding mixture, erosion of the surface layers of the gating system occurs easily, and that

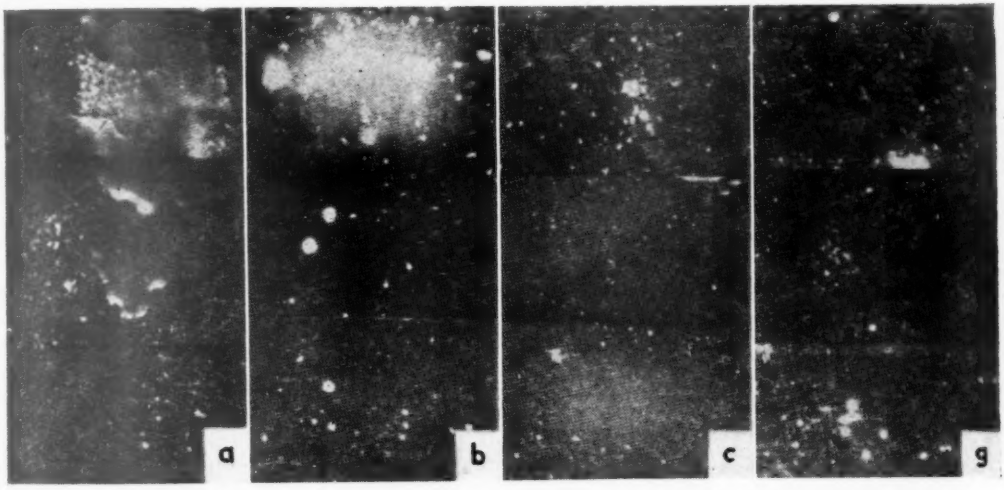
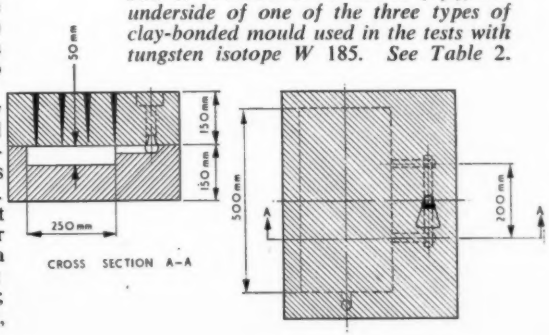


FIG. 5.—*Radiographs of the surfaces of castings which were poured through core inserts—prepared from a sand/clay mixture—these inserts being of varying shapes:—*(*a*) *without sprue-base;* (*b*) *with a semi-spheroidal sprue-base;* (*c*) *with a deep sprue-base. Illustration* 5 (*g*) *shows a radiograph taken when the core insert had been compacted with six blows of the rammer, instead of the three used for the earlier specimens.*

as is shown in Fig. 4, where (1) denotes the insert. Inserts forming the base of the sprue were of varying shapes:—(*a*) without sprue base, (*b*) with a semi-spheroidal sprue-base having a radius equal to that of the sprue, and (*c*) with a deep sprue base.

These core inserts were prepared from sand/clay mixtures and rammed by three blows of a standard laboratory rammer. To assess the effect of ramming density, tests were also made with core inserts compacted with six blows of the rammer (see Fig. 5 (*g*)). The results of tests in which the different sprue-base inserts were used are brought together in the form of radiographs in Fig. 5. Provision of a special sprue-base serves the following purposes: to lessen the impact of the stream of liquid metal; to reduce its erosive action on the sprue base and,

FIG. 6.—*Vertical cross-section* (*left*), *and underside of one of the three types of clay-bonded mould used in the tests with tungsten isotope W* 185. *See Table* 2.



Study of Non-metallic Inclusions

the entrained particles are carried by the metal stream into the casting. Maximum erosion takes place at the bends in the gating system, and to a lesser extent along the horizontal parts of the system.

Gating System

In order to determine the effect of the gating system design on the entrainment of slag inclusions, and the nature of the distribution of these inclusions in castings, tests were carried out in which moulding mixture containing radioactive tracer was poured on the surface of metal in the pouring basin. In view of the fact that the probability of entraining slag inclusions into gating systems is greater in the case of ladle-poured iron, than in pouring steel, the former was used for making test castings. In these tests three types of clay-bonded moulds were used; Fig. 6 illustrates one of these types. Dimensions of the cross-sections and the ratios of the components

TABLE 2.—*Size Ratios of the Experimental Gating Systems Used.*

Ratio.			*Cross-Sectional areas in gating system—sq. cm.			Type of gating system (and key to Fig. 7.)
F1	F2	F3	Downsprue. F1	Runner. F2	Ingate. F3	
1.0	1.2	1.4	5.74	6.9	8.0	Expanding—(*a*)
1.4	1.2	1.0	11.2	9.6	8.0	Contracting—(*b*)
1	1	1	8.0	8.0	8.0	Uniform—(*c*)

* The relationship in which the cross-sectional areas of down sprue, runner and ingate stand to each other are given in the "Ratio" column. Thus the relation of 5.74 : 6.9 = the ratio 1 : 1.2. Where the gating system neither contracts nor expands the cross-sectional areas of the three components stand in the ratio 1 : 1 : 1 (last line of table).

of the gating systems are listed in Table 2.

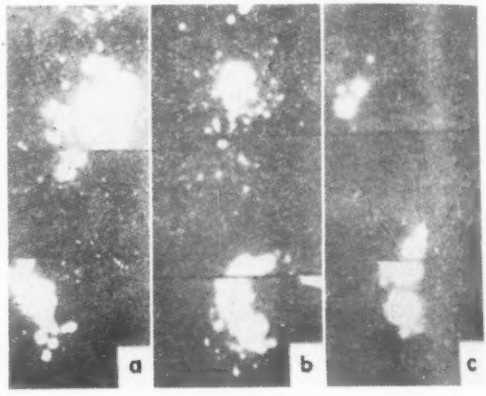
Iron of the type SCH 15-32* was poured into the moulds at the temperature of 1,300 deg. C. within 20-30 sec. For a period of 5 sec. after the beginning of pouring, non-metallic particles were introduced in the form of clay moulding mixture containing a radioactive isotope of tungsten, quantity 5 gm. and activity of 2.5 Tμc†. Radiographs of the distribution of the slag particles in the top-surface layers of the iron plates (Fig. 7) show that these inclusions are retained to approximately the same extent by all three types of gating system, and in each case a change of the ratios of the cross sections of the gating system components has not affected the retention of slag. Provisional calculations show that sand grains having a diameter of 0.2 to 0.3 mm. cannot succeed in rising to the top surface in the time taken by the stream of metal to get to the mould.

[* The comparative study of foreign specifications on which the British Steel Castings Research Association is engaged has not yet embraced Russian standards. However, it has been definitely determined that "35L" refers to carbon steel.—Editor.]

† Presumably the units are millicuries—Editor.

A radiograph of a typical section of a gating system (Fig. 8) shows that the slag inclusions in the channels of the gating system are concentrated chiefly at the bends (turns) where the stream of metal changes direction, and the greatest concentration occurs at the joint of slag trap and feeding

FIG. 7.—*Radiographs of the top-surface layers of three iron plates, each plate having been cast with a different gating system, (a) expanding, (b) contracting, (c) uniform (see Table 2).*



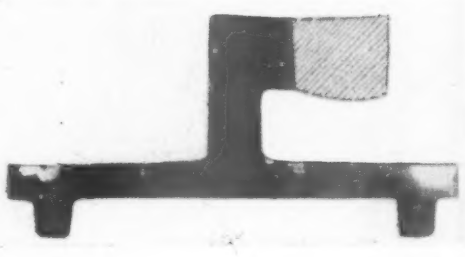


FIG. 8.—*Radiograph of a typical section of a gating system, showing the distribution of slag inclusions.*

head. The metal stream loses its velocity at the bend and facilitates thereby the rise of slag particles. Fine particles, having an insufficient velocity of rising, are carried by the metal stream and are forced towards the regions of the bottom surface of the casting; whereas the larger ones succeed in getting to the surface and distribute themselves in the top surface layers of the castings, mainly near the base of the feeding head.

Sir PETER ROBERTS, chairman of Newton Chambers & Company, Limited, opened an employee's sports pavilion, costing over £16,500, at the firm's Mortomley sports ground on Saturday afternoon, September 13. The club room has glass on three sides and gives an uninterrupted view over the whole of the sports ground.

A COAL-HANDLING PLANT costing about £800,000 is being built by the Birtley Engineering Company, Limited (Co. Durham), to serve the new £30,000,000 power station now under construction at Blyth (Northumberland). The plant will handle about 4,000,000 tons of coal annually and will supply the new station at the rate of 600 tons an hour.

American Society for Testing Materials

Report on the Boston Annual General Meeting

The American Society for Testing Materials held its 61st Annual General Meeting on June 22-27 at Boston, Massachusetts. A brief summary of one aspect of the Society's deliberations has already been given in the JOURNAL.* *A fuller report on its activities can now be presented, together with abstracts of some of the technical papers included in the Boston meeting.*

At the 61st annual meeting of the American Society for Testing Materials, held in Boston, Mass, on June 22-27, foundry topics were "highlighted" by papers on the hot strength of cast iron, malleable iron and tin bronzes. Specification committees dealing with cast iron expended most of their effort on discussions of the short bar as a tensile-test specimen. In one specification pertaining to elevated temperature service for pressure vessels, the length of bar required was left to the discretion of the producer with only a tensile-test piece length required.

Specifications for s.-g. irons were not disturbed, but a new programme on developing specifications for pipe valves and fittings is in progress. Austenitic cast irons are also ready for specification and further discussions took place on pig-iron, chilled-iron castings and on the low-temperature properties of cast iron. The B-2 non-ferrous raw materials committee has drawn up an excellent classification for tin which lists the grades and composition of ingot tin. A similar classification and specification for about seven grades of copper is in existence. Other non-ferrous metals are fitted with specifications and no new developments occurred.

The non-ferrous bronze-castings committees did not meet in June and will not do so until next October. The light-alloys committee (which deals also with die-casting materials) confined their deliberations to adjustments of composition details in existing specifications, and no new materials were reported upon. The joint ASTM-ASME committee† on elevated temperature properties reported the conclusion of their work on cast iron, and will continue their programmes on other metals none of which involve foundry products. Some of the more immediately interesting material presented during the meeting is briefly summarized in what follows.

Creep Properties of Three Low-shrinkage Copper-base Casting Alloys

By Ward F. Simmons and J. G. Kura.

A creep evaluation was conducted on cast specimens of 80-10-10, 85-5-5-5 and Navy "M" alloys (88-6 tin-2 lead-4 zinc) at 180, 230 and 290 deg. C. Most of the tests were conducted for a period of 2,000 hr. At one temperature for each alloy, the creep tests were caried out to 10,000 hr. duration. Creep-rupture tests were also made at this temperature. At 180 deg. C., the highest creep resistance was exhibited by 88 alloy. At 230 deg. C., the 88 and 85 alloys were about equal. In creep resistance at 290 deg. C., the 88 alloy appeared to be more stable than the 85 alloy at this temperature. A summary of the creep and rupture strengths for these alloys is shown in Table 1. Room-temperature strength on unbroken creep specimens which had been tested at 290 deg. C. is shown in Table 2.

TABLE 1.—*Creep and Rupture Strengths for Three Copper-base Alloys.*

Alloy.	Temperature, deg. C.	Creep strength, lb. per sq. in. Creep rate per cent. per 100,000 hr.	Rupture strength, lb. per sq. in. 1,000 hr.
80–10–10	230	16.31	33.06
85	290	15.43	21.16
88	290	13.66	25.79

TABLE 2.—*Room-temperature Strength on Unbroken Creep Specimens Tested at 290 deg. C.*

Alloy.	Temperature, deg. C.	Yield strength, lb. per sq. in. 0.2 per cent. offset.	Ultimate strength, lb. per sq. in.	Elongation, per cent. 2-in. gauge length
85				
A*	—	31.74	77.60	32.0
B†	290	35.27	41.88	4.3
88				
A	—	34.60	89.51	46 0
B	290	46.29	51.14	3.0

* A = before creep testing.
† B = after creep testing.

Discussion developed that similar work elsewhere confirmed the results reported in this paper except that the 85 metal seemed to possess better properties than its companions. Some additional discussion raised the issue of whether segregation during exposure to heat or at any other time might be the cause of the deterioration in tensile strength and ductility shown in the room-temperature tests upon specimens that had been exposed to creep tests. The question of whether contamination might be a factor in this connection was also debated.

Short-time Elevated-temperature Tension Tests of Metallic Materials

The report of the ASTM-ASME on elevated temperature strength of cast iron included the

* See *American Letter*, FOUNDRY TRADE JOURNAL, August 14, p. 196, under the heading "Standardization of Nomenclature."

† A committee comprising members of the American Society for Testing Materials and the American Society of Mechanical Engineers. The report in question is summarized on page 346.

ASTM Annual General Meeting

results of tests upon creep strength, growth and thermal shock. Fourteen commercial cast irons were tested in the programme and of them seven survived to be reported upon. These seven are listed in Table 3. The results showed that none of the cast irons were fit to serve at 540 deg. C. At 430 deg. C, the plain iron No. 13 indicated ability to carry a 4.46 tons per sq. in. load, while its alloyed companions No. 15 and 10 could carry about twice the load. The remaining irons were heat-treated and therefore penalized in this respect as requiring special preparation to serve within the limits of ASTM Specification A-278.

No. 8 was a ferritic s.g.-iron type of material. Irons Nos. 15 and 10, which were alloyed, led the investigators to deduce that molybdenum additions improve creep strength, that nickel improves thermal shock resistance, and chromium structural stability. The completed report which represents four or five years of laboratory testing work will be prepared for publication and sale during the forthcoming year.

TABLE 3.—*Composition, Conditions, and Structures of Test-alloys.*

Alloy No.	1.	5.	7.	8.	10.	13.	14.
Condition	As cast	As cast	Annealed[2]	Annealed[2]	As cast	As cast	Annealed[4]
Total carbon, per cent.	3.31	2.98	3.22	3.56	3.20	3.27	3.06
Carbon equivalent[5]	3.83	3.46	3.85	—	3.82	3.87	3.61
Silicon	1.56	1.51	1.97	2.67	1.96	1.74	1.79
Manganese	0.68	0.57	0.74	0.53	0.64	0.72	0.70
Phosphorus	0.19	0.11	0.13	0.11	0.11	0.26	0.04
Sulphur	0.114	0.099	0.098	0.021	0.090	0.156	0.09
Chromium	0.08	0.05	0.57	0.02	0.41	0.08	0.61
Nickel	0.08	1.56	0.03	0.04	1.12	0.15	0.04
Molybdenum	0.73	0.58	0.01	0.01	0.44	0.07	0.84
Vanadium	0.02	0.01	0.02	0.04	0.118	0.02	0.01
Magnesium	0.01	0.01	0.01	0.080	0.01	0.01	0.01
Graphite[6]	A-4	A-4	A-4	Spheroidal	A-4	—	A-4
Matrix	Pearlite	Pearlite	Pearlite + Ferrite	Ferrite	Pearlite	—	Pearlite[7]

NOTES:—[1] All alloys are grey iron except No. 8 which is nodular iron. [2] Heat-treated four hours at 899 deg. C. and furnace cooled. [3] Nodular iron heat treated to the ferritic condition by holding four hours at 899 deg. C. and furnace-cooling at the rate of about 100 F per hour. [4] Heat treated 30 minutes at 704 deg. C. and air cooled. [5] Carbon equivalent = per cent. carbon + 0.3 (per cent. silicon + per cent. phosphorus). [6] ASTM Recommended Practice A 247. A-4 indicates randomly distributed medium-size graphite flakes. [7] About 10 per cent. of the pearlite was spheroidized by the subcritical anneal.

Mechanical and Physical Properties of Three Low-shrinkage, Copper-base Casting Alloys

By J. G. Kura and R. M. Lang.

Data were obtained on the mechanical and physical properties of low-shrinkage, copper-base casting alloys measured at room temperature and at −40 deg. F. to 290 deg. C. The tensile properties for an average of 12 to 18 tests on each material appear in Table 4. The tensile strength was somewhat higher at −46 deg. C. than at room temperature. For temperatures up to 230 deg. C. the short time tensile strength decreased about 25 per cent. from its room temperature value.

TABLE 4.—*Tensile Properties of Three Copper-base Alloys.*

Alloy.	Tensile strength, tons per sq. in. average.	Elongation. 2-in. gauge length per cent.
80–10–10	17.50	30
85–5–5–5	15.75	32
88–6–4–2	18.16	45

The several properties which were determined were:—Compressive strength, V-notch Charpy impact strength, hardness, fatigue characteristics, machinability, melting range, patternmaker's shrinkage, density and specific gravity, electrical resistivity, thermal conductivity and thermal expansion. The data presented in this paper constitute the first portion of a continuing programme in which additional alloys will be studied.

Discussion during the session developed the realization that alloys to be studied were leaded semi-red brass, manganese-bronze, silicon-bronze and nickel-silver.

Stress-rupture and Creep Properties of Malleable Iron at Elevated temperatures

By Lauriston C. Marshall and George F. Sommer

Tests were made on low carbon, 2.10/2.40 TC, and high carbon, 2.40/2.70 TC, malleable. Silicon contents were at 1.0 for ferritic and 1.30 for pearlitic. The ferritic types over a temperature range of 15 to 650 deg. C. had an initial strength of 24.89 tons per sq. in., with 20 per cent. elongation. It held its strength up to 370 deg. C., then weakened progressively with increasing temperature in short-time tests. Elongations decreased to 10 per cent. in the 200 to 370 deg. C. range, then increased rapidly.

Pearlitic malleables, with a wider scatter in the 31.25 tons per sq. in. to 40.16 tons per sq. in. room-temperature range and a 5 to 15 per cent. elongation, lost half of their ductility in the 205 to 370 deg. C. range. At higher temperatures the strength decreased and the elongation increased. Stress rupture tests for 1,000 hr. are set forth in Table 5.

TABLE 5.—*Results of Stress-rupture Tests on Malleable Iron at Elevated temperatures.*

	1,000 hours at 430 deg. C. tons per sq. in.	Extrapolated to 10,000 hr., tons per sq. in.
Pearlitic malleable	20.08	17.85
Low-carbon ferritic malleable	11.16	9.82
High-carbon ferritic malleable	8.03	6.25

Note.—Fractures were transcrystalline at 430 deg. C. and intercrystalline at 650 deg. C.

Discussion developed the fact that the malleable cast irons were falling behind other ferrous

material in applications for service at elevated temperatures. In the case of malleable, its usage was limited to a temperature maximum of 230 deg. C. provided it possessed an elongation of 18 per cent. It was used with a design-safety factor of 10 to 1. Cast iron and s.-g. iron had both managed to acquire acceptance up to 345 deg. C. for specific compositions and in certain instances the s.-g. iron was acceptable with a safety factor of 5 to 1.

Engineers were concerned with the inferiority of these materials when compared to cast steel. There was concern about thermal fatigue and impact strength. It was hoped that the usage of malleable might be extended if its creep strength were defined and if its stability and tendency toward carbon absorption were similarly determined. These requirements, including weldability and experience, would in time enable it to compare favourably with other cast ferrous materials.

There was some mention that ASTM specifications provide for seven grades of malleable iron while the tests were limited to only a few of these. The author pointed out that the results were only a part of the overall programme and that experiments were continuing.

Tin Scheme's Finances

Rumours which had been prevalent on the London Metal Exchange that sums had been contributed by the Government to the buffer stock manager of the International Tin Council to enable him to support the price of tin were denied by the Board of Trade last week.

The reports followed increased buying activity by the buffer stock in recent days since the price of tin kept closely to the floor level of £730 a ton and the forward price had dropped below it. It was reasoned that, with the buffer pool reaching 22,400 tons by the end of last March, the supplies of the initial contributions by producing countries had nearly been exhausted. With additional buying since then the special contributions asked for earlier this year might also have reached exhaustion point.

Further arguments said it was possible that, because it was giving financial support to the buffer pool, the Government had been quick to support Malaya's plea recently to limit tin imports from the Soviet Union.

Revised Contract for Standard Tin

A revised contract for standard tin, which has been approved by the board of the London Metal Exchange, will become operative for prompts maturing on and after January 1, 1959.

The main difference from the old contract is that only registered brands will be deliverable on the London market, thus bringing tin into line with the contracts for other metals. Hitherto, certain brands of tin not registered, such as Chinese, were deliverable on the market. Chinese tin will now have to be registered to qualify for delivery against the revised standard contract.

UK Foundry Exhibition

In its attraction to exhibitors, the Foundry Exhibition to be held at Bingley Hall, Birmingham, from May 21 to 30, 1959, is already an unqualified success, as a very high proportion of the stand space has now been sold. Those firms who are still undecided whether or not to show should make up their minds quickly or they may regret a lost opportunity.* The following list shows the space allocation situation up to September 11:—

LIST OF EXHIBITORS ALLOCATED SPACE

Air Automation Ltd.
Wm. Aske & Co. Ltd.
Acme Conveyors Ltd.
Air Control Installations Ltd.
August's Ltd.

British Moulding Machine Co. Ltd.
Baker Perkins Ltd.
Ballard, F. J., & Co. Ltd.
F. W. Berk & Co. Ltd.
Francis W. Birkett & Sons. Ltd.
Birlec Ltd.
Keith Blackman Ltd.
E. Boydell & Sons Ltd.
Bradley & Foster Ltd.
British Foundry Units Ltd.
British Industrial Sand Ltd.

Catalin Ltd.
Coreshooters Sales Ltd.
Constructional Engineering Co. Ltd.
Carborundum Co. Ltd.
Coleman-Wallwork Co. Ltd.

Dallow Lambert & Co. Ltd.
Distillers Co. Ltd.
Dohm Group of Companies Ltd.
H. J. Dowler (Engineers' Pattern Makers) Ltd.

Electromagnets Ltd.
Roy, Evans

Fletcher Miller Ltd.
Floodgate Steel Fabricating Co. Ltd.
F. & M. Supplies Ltd.
Fordath Engineering Co. Ltd.
Foundry Mechanisations Ltd.
Foundry Plant & Machinery Ltd.
Foundry Services Ltd.
Foundry Suppliers Ltd.
"Foundry Trade Journal"
Fuel & Metallurgical Process Ltd.
Fullers' Earth Union Ltd.

General Refractories Ltd.
George Green & Co.

Harborough Construction Co. Ltd
Hepburn Conveyor Co. Ltd.
W. C. Holmes & Co. Ltd.
W. J. Hooker Ltd.
R. J. Hunt & Son Ltd.

Imperial Chemical Industries Ltd.
Incandescent Heat Co. Ltd.
Industrial Newspapers Ltd.

J. W. Jackman & Co. Ltd.

E. S. Lord Ltd.
Lafarge Aluminous Cement Co. Ltd.
Law Wills & Co. Ltd.
Lees Hall & Sons Ltd.
Luke & Spencer Ltd.

Mitchell's Emery Wheel Co. Ltd.
Marco Conveyor & Eng. Co. Ltd.
Metals & Equipment (Wolverhampton) Ltd.
Midland Tar Distillers Ltd.
Modern Furnaces & Stoves Ltd.
Monometer Manufacturing Co. Ltd.
Morgan Crucible Co. Ltd.

New Conveyor Co. Ltd.
Newton Collins Ltd.

Production Chemicals (Rochdale) Ltd.
Paterson Hughes Engineering Co. Ltd.
Peco Machinery Sales.
G. Perry & Sons Ltd.
Platt Metals Ltd.
Prat-Daniel (Stanmore) Ltd.
Pneulec Ltd.
Premo Pattern Co. Ltd.

Rapid Magnetic Machines Ltd.
Richards Structural Steel Co. Ltd.
Ridsdale & Co. Ltd.
E. A. Roper & Co. Ltd.
F. E. Rowland & Co. Ltd.

Shell Chemical Co. Ltd.
H. G. Sommerfeld Ltd.
Spencer & Halstead Ltd.
Spermolin Ltd.
Sterling Foundry Specialties Ltd.
Sternol Ltd.

Temple Instruments Ltd.
G. & R. Thomas Ltd.
Tilghman's Ltd.

Universal Pattern & Precision Eng. Co. Ltd.

Warner & Co. Ltd.

AWAITING ALLOCATION

East Midlands & West Midlands Gas Board.
Scintilla Ltd.
Crockett Lowe, Ltd.
Harris Engineering Co. Ltd.

* The organizers of the exhibition are Herbert Daniels Exhibitions, Limited, 3, Clifford Street, London, W.1; phone REGent 8611.

THE NEW London headquarters of the Shell Petroleum Company, Limited, now being built at South Bank, near Waterloo Station, are to be heated by three Babcock oil-fired Corner-tube high-pressure hot-water boilers, which have been ordered from Babcock & Wilcox, Limited, by G. N. Haden & Sons, Limited, the heating and ventilating engineers.

Company News

NORTH CENTRAL WAGON & FINANCE COMPANY, LIMITED—The National Provincial Bank announces that its offer to acquire the ordinary shares of the company has become unconditional. Acceptances, it is stated, have been received in respect of 90 per cent. in value of the shares.

CRAVEN BROS. (MANCHESTER), LIMITED, machine-tool makers, of Reddish, near Stockport (Lancs)—The company is raising the interim dividend from 2½ per cent. to 3½ per cent. on account of 1958. There was a 5 per cent. final, making a 7½ per cent. dividend for 1957, compared with 10 per cent. previously.

SWAN, HUNTER, & WIGHAM RICHARDSON, LIMITED, ship builders and repairers, etc., of Wallsend (Northumberland)—The company is maintaining its interim dividend at 5 per cent. on account of 1958 on a capital increased by the acquisition of a minority interest. A 13 per cent. final was paid on the present capital for 1957.

BRITISH WAGON COMPANY, LIMITED—By approving the proposed increase of capital to £2,550,000, shareholders have opened the way for the Royal Bank of Scotland, Limited, and its associates, Williams Deacon's Bank, Limited, and Glyn Mills & Company, to acquire a 40 per cent. interest. The banks are to subscribe for 505,000 £1 shares at 92s. 6d. each, involving a consideration of about £2,300,000.

JAMES HOWDEN & COMPANY, LIMITED, marine and general engineers, of Glasgow—The company is repeating the 25 per cent. dividend for the year to April 30, 1958, on a capital increased by a one-for-four rights issue to £1,365,000, with a 20 per cent. final. Group profits, before tax, contracted from £1,124,820 to £905,039. Tax absorbs £507,380 (£562,232), leaving a net profit of £397,659 (£562,588).

CHARLES ROBERTS & COMPANY, LIMITED, rail and road vehicle manufacturers, etc., of Horbury Junction, near Wakefield—The company may make an offer to acquire for cash the £200,000 6 per cent. preference capital of Hurst, Nelson & Company, Limited, manufacturers of railway rolling stock and component parts, of Glasgow. The ordinary capital was acquired last year. No final decision will be made until after a board meeting. Meanwhile, Hurst, Nelson preference shareholders are advised not to dispose of their shares until they receive further details.

EFCO Increases Profits

Lower cost of manufacturing and of sea freights, compared with road haulage should enable Efco, Limited (formerly the Electric Finance Company, Limited), to compete on the Atlantic and Pacific seaboards, states the chairman, Mr. D. F. Campbell, in his annual report. This opinion was based on recent experience of shipping a large steel-melting furnace from Glasgow to Vancouver.

In the heavy steel furnace division an outstanding technical success was the starting of an 80-ton arc furnace for the Iscor steelworks, near Pretoria. This, the largest furnace in the southern hemisphere, was put into regular production from the first day of operation and had been achieving a remarkable output of ordinary qualities of carbon steels. Two additional orders for arc furnaces were approaching completion—one for the Union Steel Corporation (of South Africa), Limited, and another for the Vanderbiil Engineering Corporation, Limited.

The group net profit, after tax, other than profits tax on distributions, amounted to £143,428 (£123,883) in the year ended March 31, 1958, and the dividend is raised from 12½ per cent. to 15 per cent.

Another New Share Issue Mooted for Broken Hill

Capital expansion last year by the Broken Hill Proprietary Company, Limited, iron and steel makers and colliery owners, of Melbourne, Australia, totalled £A23,000,000 and expenditure at that rate would be needed for some years, it was stated at the annual meeting. The chairman, Mr. C. Y. Syme, said that the board would probably consider another new share issue in 1959.

Expansion would be financed by borrowed money, increased share capital, and from internal funds and, during the next 12 months, the company would increase long-term borrowings by £A8,000,000 to about £A20,000,000.

Plans for the development of a steelworks at Whyalla, where it was proposed to spend £A30,000,000 by 1970, were now being worked out. These plans would be influenced materially by future market considerations and likely technical developments in the industry. Facilities now being installed, said Mr. Syme, would further increase the productive capacity of the group beyond 3,000,000 tons of ingot steel reached in the year to May 31 last.

Referring to the company's shipbuilding activities, the chairman said that the next launching, scheduled for late November, was a 19,000-ton ore carrier for its own fleet. This would be the biggest vessel yet built in Australia. Consolidated net profit of £A9,299,219 for the year ended May 31, 1958, showed a rise of £A1,915,924, or 25.9 per cent. on the 1956-57 figures.

No Ordinary Dividend by Hurst, Nelson

The board of Hurst, Nelson & Company, Limited, makers of railway rolling stock, component parts, dropforgings, etc., of Motherwell (Lanarkshire), propose to pay no ordinary dividend for the year ended March 31, 1958, compared with 7½ per cent. for the previous year. After £48,933 (£44,749) for depreciation and £55,821 (£77,912) for taxation, the group net profit declined from £19,430 to £18,778.

Losses of subsidiary companies attributable to minority shareholders amounted to £1,564 (£1,010) and balance of net profit attributable to the holding company was £20,342 (£20,440) of which £5,431 (£215) was retained by a subsidiary and £6,900 (same) was appropriated for payment of net dividend on preference shares for the year.

Tata Iron & Steel Profits Decline

Gross revenue of the Tata Iron & Steel Company, Limited, Bombay, for the year ended March 31, 1958, improved from Rs.440,370,000 to Rs.479,950,000, notwithstanding a substantial increase in expenses, which rose from Rs.325,880,000 to Rs.384,700,000. Gross profit fell from Rs.114,490,000 to Rs.95,250,000.

After providing Rs.9,000,000 (Rs.27,160,000) for taxes (including Rs.1,600,000 wealth tax) and Rs.27,900,000 (Rs. 25,970,000) for plant rehabilitation and development, the net profit amounted to Rs.19,280,000, compared with Rs.26,270,000 the previous year. During the year the capital was increased from Rs.259,420,000 to Rs.306,600,000.

SIR HAROLD HARTLEY, F.R.S., who celebrated his eightieth birthday on September 3, left by air for Montreal on September 5 to represent the Government at the sectional meeting of the World Peace Conference.

St. Albans Diecasters, Limited

Engineering & Lighting Equipment Company, Limited, Develop their New Subsidiary

St. Albans Diecasters, Limited, was formed two years ago as a subsidiary of Engineering & Lighting Equipment Company, Limited, of St. Albans, whose history started some 60 years ago, and who for a number of years had a small sand foundry producing castings for Admiralty equipment and street-lighting fittings. In 1954, the parent company built and equipped an extensive gravity-die-casting foundry, for the production of aluminium and other non-ferrous castings, for its own consumption and with a view to supplying the trade. So successful was this branch of the business, that in 1956 a new company with the above title was formed and further extensions were made to the sand foundry, the patternshop and fettling shops (see Fig. 1). The number of persons now employed by St. Albans Diecasters, Limited, totals about 50 and the shop-floor area is 14,500 sq. ft.

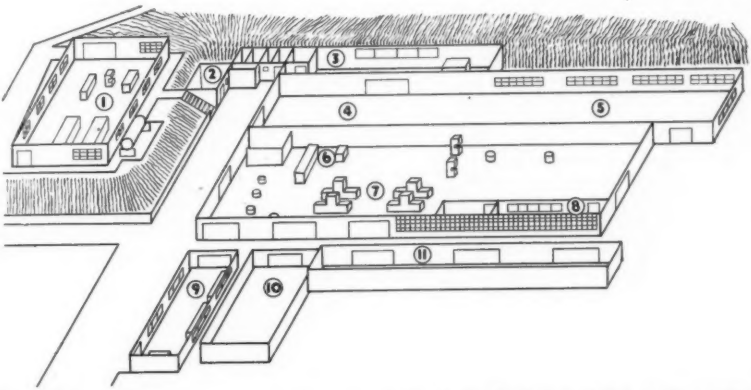


FIG. 1.—*Schematic layout of the foundries of St. Albans Diecasters, Limited.*

Key: (1) Patternshop. (2) test room. (3) melting bay. (4) sand foundry. (5) coreshop. (6) shell moulding. (7) die foundry. (8) drawing office. (9) fettling shop. (10) die and pattern stores, and (11) castings storage.

Gravity-die Foundry

The gravity-die-casting foundry occupies a floor space of over 5,000 sq. ft., the building being of modern construction with all-round access and excellent lighting, heating and ventilation; and this, associated with modern washing facilities, provides excellent working conditions.

The foundry is equipped with two 400-lb. and two 800-lb. Sklenar Reverabale furnaces for melting aluminium, also one 400-lb. and three 200-lb. capacity bale-out furnaces for melting yellow metals, all these furnaces are oil-fired, the necessary air being supplied by Broom & Wade compressors, which also supply compressed air for working all the dies and ancillary equipment in the foundry. Pressure testing of castings is carried out on the premises and test-bar, and analytical, reports are supplied from the firm's laboratories if so desired.

In these days of mechanization the foundry is well to the forefront, in that they have specialized since their inception in the adoption of all types of labour-saving methods. The majority of dies are equipped with air cylinders or racks-and-pinion mechanisms to perform movements previously carried out by levering and hammering. By mechanizing movement of dies, their life is increased and production time is improved, thus contributing towards greater efficiency.

Range Produced

The types of die-castings produced in this section are so varied that it would be almost impossible to cover all in this article. However, it can be said that as a result of producing such large quantities of lighting fittings, filter heads, frames, pump-bodies, and by constantly changing and improving techniques used the firm is rapidly building up a reputation as specialists in this field. Castings produced vary in size from half an ounce up to 30 lb. The foundry now despatches the major part of its output to outside contractors; they are widely used in electrical and mechanical equipment supplied to the Admiralty, Ministry of Supply, borough engineers and many large engineering firms. The company is approved by the Air Registration Board for the supply of castings and is A.I.D. approved. All dies are made in the company's own tool-room by first-class toolmakers who have acquired a vast amount of "know-how" of die-casting techniques.

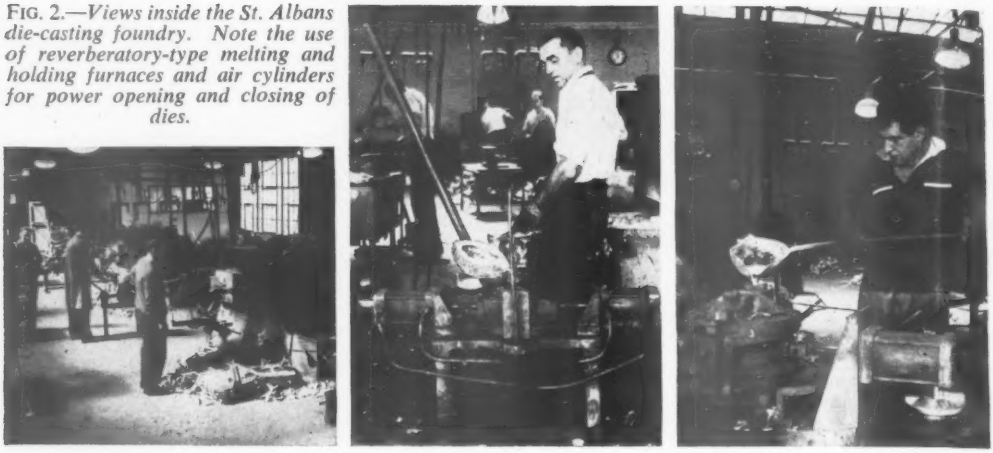


FIG. 2.—*Views inside the St. Albans die-casting foundry. Note the use of reverberatory-type melting and holding furnaces and air cylinders for power opening and closing of dies.*

Sand Foundry

The sand foundry is situated next door to the die-casting foundry and occupies a similar floor area. It is equipped with two 120-lb. crucible melting furnaces and also sand mixers, sand dryers and riddling machines. It is currently producing castings in all the well-known non-ferrous alloys, varying in weight from ½ oz. up to 130 lb., these are partly for the company's own consumption and also for the Admiralty, Ministry of Supply, borough engineers and large engineering concerns.

The foundry is essentially engaged in short-run production and thus the labour force needs to be of the highest calibre. However, the company is expanding and in the near future, with the introduction of moulding machines and additional furnaces, will be turning in addition to production against long-run contracts.

The majority of the castings produced at the moment are boxes and lids and equipment for control-gear on board H.M. ships, and of course these castings have to be of the highest quality, to withstand, in certain cases, pressures of up to 300 lb. per sq. in.

Coreshop and Shell Moulding

The coreshop is housed in the sand foundry and cores are produced either in oil sand or by the CO_2 Process. The latter is of comparatively recent introduction; up to one year ago all the cores used were produced in oil sand and dried in a core oven, this oven having a capacity of 280 cub. ft. When orders for castings increased and consequently more cores were required the CO_2 Process was introduced to help to cope with the extra load, with excellent results.

Shell moulding is a method of casting production also fairly recently introduced to these works. The machine used for this work is of the double-station type, supplied by Foundry Equipment, Limited, and is capable of producing 20 shells per hour per station. One order of particular interest recently received is for 500,000 terminal-block castings used by the Admiralty; 64 of these castings can be produced in one shell mould and, consequently, the method is very competitive with the production of similar castings by pressure-die-casting. Castings of up to several pounds in weight have also been produced by the company in shell moulds.

Should the castings require coring, then the company is equipped with a shell coreblower on which cores varying in size from 4 by ¼ by ⅛ in. to cores of quite large proportions have been made.

Patternshop

The firm's patternshop was erected in 1956 and has a floor area of 1,600 sq. ft. It is equipped with the most modern designs of woodworking machinery, including planer, bandsaw, routing machine, woodworking lathe, bobbin and disc sander, and also a milling machine for metal-pattern work.

The frequency and diversity of new schemes undertaken keep the patternshop fully occupied, whether it be producing patterns in wood, plaster or metal or even for producing fibre-glass moulds or models for use in other sections of the works.

Fettling Shop

The fettling shop at the St. Albans foundry covers a floor area of almost 1,000 sq. ft. and is provided with machinery for handling all the varied types of castings produced by the company. This includes an abrasive cutting-off machine for trimming yellow-metal castings, backstand grinders, polishing machines, linishing machines and a rumbler barrel. Metal-cutting bandsaws are housed in the die foundry, so that all aluminium castings can be trimmed before being passed through to the fettling shop.

Conclusions

Sections of the works of particular interest to foundrymen have been briefly surveyed in this account, but it should be pointed out that the parent company has in close proximity large machine

shops and assembly shops. There are also Perspex and fibre-glass moulding and forming departments, Bakelite moulding, sheet-metal and press shops, tool-room and drawing offices.

In short, methods of manufacture in competition with casting are to be found *right inside the same works*. This serves to keep the foundry personnel very much "on their toes" and fully conversant with the desirability of continuous process improvement and cost reduction.

All employees of the firm enjoy excellent working conditions. A comprehensive pension scheme is in being and covers all grades. There is also a sports and social club and a first-rate canteen. Every encouragement is given to apprentices, and they are allowed adequate releases each week to attend day classes. The company is keenly alive to new techniques and is still expanding on modern lines, continuous efforts being made to improve the quality of the many types of castings produced.

American Letter

Purdue Casting Conference, October 30-31

The plans and programme have been announced for the annual Metals Casting Conference to be held at Purdue University, West Lafayette, Indiana, USA, from October 30 to 31. This year, the programme has been expanded to cover items of interest to both ferrous and non-ferrous foundrymen. The theme of the conference will be "tricks of the trade—practical, simple, cheap." Topics to be discussed include sand processing and handling, melting and fluxing, inoculation of irons, gating, nodular iron, cost concepts, non-destructive testing, and "diversification for the foundry as a means of survival." (The last is presumed to mean "not putting all your eggs in one basket."—EDITOR.)

Lubrication Conference

At a conference on lubrication organized jointly by the American Society of Lubrication Engineers and the Lubrication Division of the American Society of Mechanical Engineers (Los Angles sections), to be held from October 13 to 15, two papers will be presented which are expected to deal partly with cast components. They are: "Metallic Friction and Wear at Elevated Temperatures," by E. P. Kingsbury and E. Rabinowicz (Massachusetts Institute of Technology), and "Wear and Metal Transfer between Sliding Surfaces," by R. P. Steijn (E. I. du Pont de Nemours & Company, Inc.). The latter includes work on the use of radio-active tracer techniques.

Diesel-electric Cars for South Africa

First of an order for two diesel-electric transfer cars has been completed in the South Works of Ashmore, Benson, Pease & Company, Stockton-on-Tees, and despatched to South Africa after successful trials on a track specially laid to the 3 ft. 6 in. South African rail gauge. The diesels were supplied by Rolls-Royce, Limited.

Power was chosen to be generated in this way to eliminate electric "hot" rails from the highline serving the storage bins of a blast-furnace installation in South Africa, thus making this area safer for plant operators.

Law Cases

Planning Authority Defied

The 77-year-old head of a 300-year-old Brierley Hill firm of ironfounders admitted at Brierley Hill magistrates' court on September 8, that for nine months he ignored a court order to close his works.

Mr. M. S. P. Hathaway, prosecuting for Brierley Hill Urban District Council, said the foundry owner, Mr. Ernest Samuel Glaze, had laid himself open to a fine of £5,000. Mr. Glaze was summoned for continuing to use his foundry at Bradley Hall, Kingswinford, in contravention of the Town & Country Planning Act, 1947, after a conviction.

Mr. Hathaway said planning permission to use the premises expired in 1956, and in December 1957, Mr. Glaze was convicted for continuing to use the foundry. In spite of the convictions work ceased only two days ago. The Council did not ask for a severe penalty and were only concerned that the works should close on the present site.

Mr. J. M. C. Higgs, defending, said Mr. Glaze had operated the foundry on its present site for 20 years. It was rather sad to see him in this predicament when his family had been ironfounders for over 300 years. It was not a case of someone starting operations in defiance of the planning authority. He could not find alternative accommodation. He had now stopped work and would shortly be moving to a new site at Pensnett.

Mr. Glaze was fined £15 and ordered to pay five guineas costs.

Pneumoconiosis Award

An award of £3,500 damages, the sum sued for, has been made by Lord Guthrie in the Court of Session to Charles William Cockburn Smith (62), a steel-castings cleaner. He sued his former employers, the Atlas Steel Foundry & Engineering Company, Limited, Armadale, claiming that he contracted pneumoconiosis as a result of his employment with them. In his judgment, Lord Guthrie holds that Smith inhaled dangerous small particles of siliceous dust during the course of his employment with defenders between February, 1943, and November, 1947, and again between May, 1948, and August, 1950, a period of seven years in all. He also holds that a substantial order for respirators as a precaution against the dust was not given until September, 1949, and that these were for the use of dressers.

Five New Companies for Eire

A public issue is to be floated next month to raise £1,000,000 for the financing of five new companies to be set up to use the former Great Northern Railway engineering works at Dundalk, Eire, now the property of the Dundalk Engineering Company, Limited.

One of these new companies will be responsible for the operation of a steel foundry for making high-class steel for cutlery, razor blades, and steel castings (this type of steel is at present imported); a second company will manufacture Heinkel miniature cars, the plant for which has been bought by Dundalk Engineering and transferred from Germany to Ireland. The third will manufacture agricultural machinery, for which the plant and stock of Bonzer & Company, Limited, has been bought; a fourth will make the chassis for heavy-duty passenger and goods road vehicles, and the fifth will undertake general engineering work, including a certain amount of repair and maintenance work on the former Great Northern Railway stock.

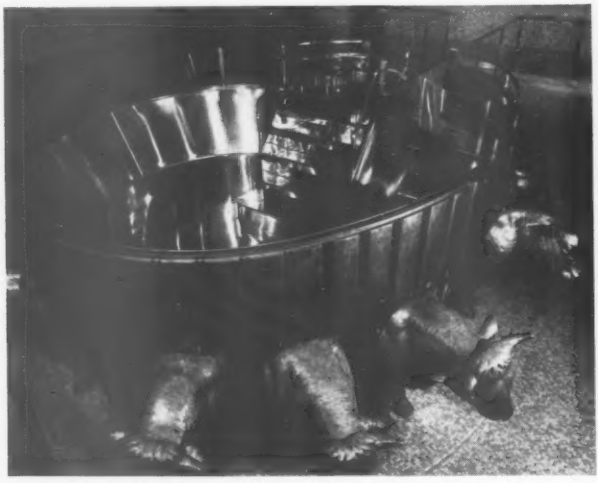
Swiss Art Castings Imported

Whilst the "London" Temple of the Latter-day Saints was open to the public, the JOURNAL'S representative took the opportunity of inspecting the baptismal font. The Temple is a magnificent edifice, situated near Lingfield, Surrey, and was dedicated on September 7. It is not a place of worship, but is dedicated for the performing of particular sacred services and ceremonial work. Indeed, only members of the Mormon community in good standing may enter after the dedication. A remarkable feature of the temple itself is that there is no very large assembly room such as one usually associates with a church or chapel. There is one fair-sized lecture theatre, but for the most part the various rooms resemble lavishly-furnished hotel lounges. There are locker rooms for each of the sexes, and a laundry and cafeteria in the basement (not shown to the public).

The stainless-steel baptismal font is supported by 12 bronze oxen, designed by an American sculptor, Mr. Millard F. Malin, Salt Lake City, Utah. The castings for the oxen were made by Brotal GmbH, Switzerland, who used the lost-wax process. The oxen, which stand 4-ft. 6-in. high at the shoulder, were cast in four sections, each 17-ft. wide, the depth of the casting being 3 ft. The oxen are surmounted by a cast-bronze frieze, 3-ft. 4-in. wide, which forms the rim of the font, the font being estimated to be about 15-ft. dia. The castings were imported into this country as works of art, free from import duty, and were erected on the site by H. H. Martyn & Company, Limited, Cheltenham, who were also responsible for making the stainless-steel font bowl.

FIG. 1.—*Baptismal font at the "London" Temple of the Latter-day Saints. The stainless-steel font is supported by 12 cast-bronze oxen imported from Switzerland, one of which is shown on the right.*

The photographs are reproduced by courtesy of Ursula Powys, A.I.B.P.



Suggestion-scheme Posters

More than 400 suggestion schemes are known to be operating in British industry and the number is growing steadily. The rapid development of this method of channelling and rewarding employees' ideas for improving products, methods and services, has created a demand for posters to stimulate interest in companies' suggestion schemes. The Industrial Welfare Society, Robert Hyde House, 48, Bryanston Square, London, W.1, has, therefore, established a new service to industry: suggestion-scheme posters, published at regular intervals, price 2s. 6d. each. The multi-coloured posters are 15-in. wide by 20-in. deep—large enough to be read at a distance, but small enough to go on a works notice-board. Six designs are available now and new designs will be published each quarter in groups of three, starting in January, 1959. The IWS is also organizing a national suggestion schemes conference to be held at the Grand Hotel, Brighton, from Friday, October 31, to Sunday, November 2.

English Electric underbids American Rivals

Britain underbid four US concerns in competing for a $1,500,000 contract for turbines to be installed in an Arkansas power project, it was revealed recently. The English Electric Company, Limited, with a "base" bid of $1,450,700 was more than $300,000 below the lowest of four American firms, but officials stated that it was not certain whether English Electric would get the contract, which still had to be evaluated.

Among factors to be taken into consideration is whether the British company possesses "complete repair and testing facilities" in the US or Canada to service the proposed equipment. English Electric claims that it has adequate repair and testing facilities belonging to an associated concern in Toronto.

The company has, however, secured an important order at home—for turbine plant for the UK Atomic Energy Authority's new advanced gas-cooled reactor. The order comprises a 33,000 kw steam turbo-alternator set, condensing and feed heating plants, with auxiliary apparatus.

Equipment & Supplies

Portable Industrial Stirrer

An air-operated portable stirrer recently introduced by the Kestner Evaporator & Engineering Company, Limited, Grosvenor Gardens, London (Fig. 1), has been pressed into service in the making of ceramic moulds for precision castings by Sankey-Telcon, Limited, in their works at Manor Royal, Crawley. This is a comparatively new process, known as the "Mercast" or alternatively the frozen-mercury process, and the installation at Crawley is the only one outside the USA. It is used for precision castings of the "difficult" metals now in demand for jet and other engine parts, wave guides for electronic equipment and so on in such metals as magnesium- and aluminium-alloys, beryllium-copper, and heat-resisting alloys. It relies on the use of frozen-mercury patterns (Fig. 2). It provides increased flexibility for the design engineers and allows the production of investment castings for both small and relatively large complex parts which have hitherto been impossible.

FIG. 1.—*Air-operated Kestner portable stirrer in action at the Crawley works of Sankey-Telcon, Limited.*

The process is that mercury is poured into closed steel dies, and the assembly then lowered into a refrigerator bath of acetone at −70 deg. C. and the mercury frozen solid. When this has been done die and mercury are withdrawn, the die is opened and the solid mercury pattern revealed. Frozen mercury welds to itself when two pieces are lightly pressed together. This enables accurate internal and external forms to be produced by preparing the pattern as several parts which can then be joined precisely in a jig. The pattern is dipped repeatedly at low temperature in a ceramic slurry to build up a thin shell mould around it, usually to a thickness of $\frac{1}{16}$ to $\frac{1}{4}$ in. The mould and mercury in it are then allowed to come up to room temperature when the then liquid mercury flows out, leaving the "green" mould. This is fired at a high temperature for two hours, and becomes a hard, strong, inert structure suitable for forming the mould for the type of casting mentioned earlier.

The Kestner stirrer takes an important part of the process. The temperature throughout the mercury freezing tank must be kept as uniform as possible and this can only be done by the type of agitation so provided. It is considered that the acetone vapour in the tank above the surface might provide an inflammable mixture with air and so the air-motor-operated stirrer is used.

Drum Storage Unit

Powell & Company, Burry Port, Carms, South Wales, have evolved a unit system for the stacking of drums. Used in association with fork-lift trucks, it makes a useful contribution to both ease of handling and neatness in the shops. The units are of tubular steel and can be easily carried by one man. Each unit holds two drums and no permanent fixtures are required to enable drums to be stored neatly and safely either indoors or outdoors. It is claimed that there is no danger from slipping as in pyramid stacking.

Die and Mould Copying Machine

The Embassy Machine and Tool Company, Limited, 248, Watford Way, Hendon, London. N.W.4, have been appointed sole agents for Michael Kampf K.G., of Bad Homburg, and are stressing the potentialities of the "FK.3" die and mould copy-milling machine (Fig. 3). The actual copy-milling unit consists of the stylus point and milling spindle rigidly braced together to form one unit. Movement of this copy-milling unit in the longitudinal direction is along the copy arm by means of prismatic guides in nitrided steel with a glass-hard surface resistant to wear and prismatic roller raceways. The milling spindle and stylus holder are guided in compound rest and

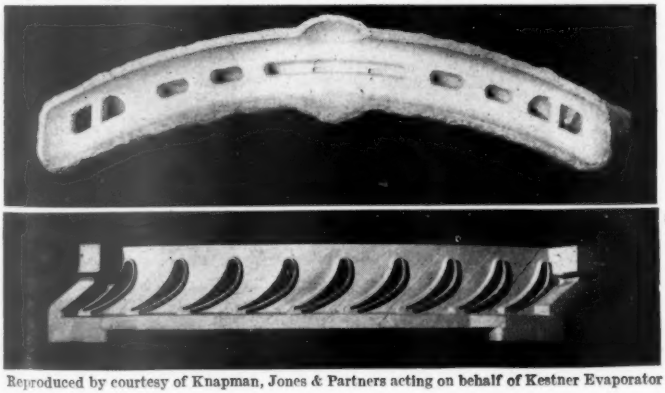


FIG. 2.—*(Top): Mould made from the solid mercury patterns (bottom): the finished casting.*

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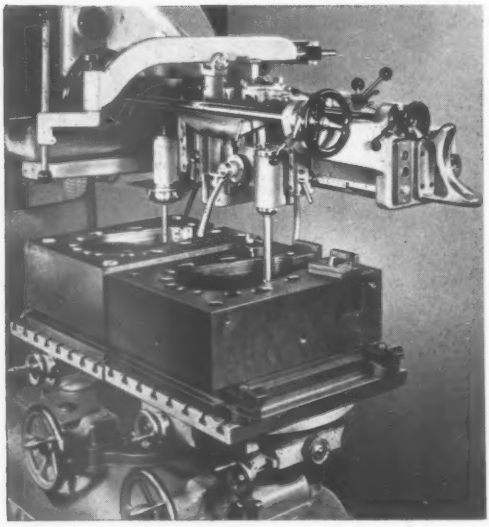

FIG. 3.—*Die and mould copy-milling machine FK.3. now marketed in the UK by the Embassy Machine and Tool Company, Limited.*

the anti-friction roller raceways ensure easy movement, free from play.

An interesting feature of the machine is its arrangement of control elements allowing it to be operated from two alternative positions, first from the front using the shoulder grip, the movement perpendicular to the machine axis being controlled by the large hand wheel and the movement of the copy-milling unit along the copy arm by means of the starwheel pinion and rack. Secondly, the machine can be operated from the side, this being the more usual position, and here movement in all three dimensions can be effected by means of the control lever.

The model has an unusually large working range for a machine of its size, covering an area of 16 in. by 20 in. in one setting without movement of tables and without movement of either die or pattern.

Copy-turning Machine

The Koller machine (Fig. 4), which has been developed from the Koller rigid turning head, is suitable for the manufacture of ball-bearing housing and also in the production of rings, collars and bushes, particularly if they have to be chamfered or internally copied. By using the principle of a fixed work-piece and rotating tools, it is possible to use carbide-tipped tools. This was not formerly very practicable because of the vibration of rod or tube, which tended to damage the tool and give a poor surface finish. Using the unit it is possible to machine from tube; turning, boring and cutting-off being done in a single operation without having to reverse the work. An additional advantage, it is claimed, is the inclusion of thread-cutting equipment which allows threads to be cut on long bores for pipelines. Newman Industries, Limited, Yate, Bristol, are sole agents for the apparatus in the UK.

Pattern Letters

A range of polythene letters specially produced for use on patterns is now available from Aldridge Plastics Limited (an A.E.I. company), 155, Charing Cross Road, London, W.C.2. The letters are pliable and can be moulded to any normal contour with ease; they can be glued or pinned without difficulty and are unaffected by water. In addition, polythene letters are resilient—it being claimed that the most rigorous hand or machine ramming is withstood without fear of burrs forming and damaged moulds resulting from pattern withdrawal. The inherent self-lubricating property of polythene completely overcomes any tendency to stick. These letters are normally produced in light grey to contrast the conventional red, yellow and black used for pattern identification.

FURNIVAL & COMPANY, LIMITED (reduction pulley division), Reddish, Stockport, have introduced the "Andantex" line of speed-reduction pulleys. They state that nothing approaching the standard of efficiency of this "gear-box within a pulley" has yet been achieved by other types of speed-reduction gear-units in this country, and that some fantastic speed reductions are possible by fitting two or more Andantex pulleys on any one given shaft. Space saving and entirely self-contained, the pulley is claimed to give troublefree performance for extremely long periods of operation, requiring hardly any attention. Applications of the pulley in industry are numerous. It is capable of giving two different speeds and reverse movement on any one unit, size range up to drives of 80-h.p. A feature of the manufacture of these units is that nylon "keys" are pressure injected into keyways *after* dummy assembly—a factor which is claimed to give near-perfect mating of gear teeth throughout the assembly.

FIG. 4.—*General view of the Koller copy-turning automatic type 200 machine, now being manufactured in the UK by Newman Industries, Limited, of Bristol.*

Publications Received

Journal of Research and Development. Vol. 7, No. 6. Published by the British Cast Iron Research Association, Alvechurch, Birmingham.

This issue contains three reports. The first is from Mr. C. T. Moore, and is on the subject of "Decarburization of White Irons under Non-graphitization Conditions." The following conclusions have been drawn:—

(1) Excess-sulphur white-irons decarburize more slowly than similar balanced-sulphur white-irons in the initial stages of decarburization before graphitization commences. (2) Increasing the austenite/carbide area of interface increases the rate of decarburization in both balanced- and excess-sulphur white-irons in the initial stages of decarburization before graphitization commences. (3) The results obtained are consistent with the suggestion that in white-irons, carbide solution in austenite is a limiting factor influencing the rate of carbon removal by gaseous decarburization. Free iron-sulphide also seems to reduce the rate of solution of carbide in austenite.

Mr. Moore is also the author of the second report "Some Factors in Influencing the Incidence of Inverse Greyness in White Irons." He has summarized his results in the following statement:—

(1) Boron contents up to 0.005 per cent. were ineffective in reducing inverse greyness in thin appendages of cast material, but they did reduce normal mottle in the heavier bar section.

(2) A bismuth content of less than 0.001 per cent. completely eliminated inverse greyness in the fins and normal mottle in the bar section of the test-castings.

(3) Moulds treated with a tellurium wash produced completely white test-castings in which only 0.0002 per cent. of tellurium was detected.

(4) Inverse greyness and normal mottle was reduced when the sulphur content of the metal was increased. When the sulphur content was in excess of that required to balance the manganese content, completely-white castings were obtained.

(5) Inverse greyness was increased by additions of ferro-manganese to the ladle metal. The high-carbon ferro-alloy produced more inverse greyness than the low-carbon alloy.

(6) Inverse greyness showed no relationship with the coal-dust content of the moulding sand and occurred in varying amounts and irrespective of the coal-dust content.

"Dross Defects in Nodular-iron Castings" is the final report. This lengthy and important research has enabled its author, Mr. A. G. Fuller, to reach a number of interesting conclusions about this material. They are:—

(1) Dross defects are thought to be comprised of a slag phase which is mainly a complex mixture of the oxides of magnesium, aluminium, calcium and silicon, together with some magnesium sulphide. This slag, which is very fluid, arises as a result of oxidation at the surface of the metal both in the ladle and during casting.

(2) A ladle addition of tellurium prior to the addition of magnesium, followed by a ladle addition of cerium when the magnesium reaction has subsided has a large effect in reducing the formation of dross in castings. This process coagulates the slag, thereby making it easier to skim the metal surface clean before casting.

(3) Increasing the addition of nickel/magnesium alloy resulting from the use of: (*a*) high treatment-temperatures, (*b*) high initial sulphur-contents of the iron and (*c*) high residual magnesium-contents of the iron, will promote the occurrence of dross defects. In order to minimize dross defects, careful control of the process is necessary to avoid having to treat high-sulphur irons, which need excess magnesium.

(4) High aluminium-contents of the iron markedly promote dross defects. The aluminium content of all materials, except those used for final inoculation, should be kept as low as possible. When silicon must be added, low-aluminium ferro-silicon should be used.

(5) The position of the occurrence of dross defects is dependent upon the pouring temperature. In general, high pouring-temperatures will minimize the defect.

(6) The gating system employed for a given mould is of considerable importance in the formation of dross defects. Although a careful study of a particular casting and its gating system is essential, the following general principles are recognized to reduce dross defects: (*a*) Avoidance of turbulence and splashing of the metal stream and (*b*) an ensurance of continuous contact between the metal stream and the sand walls of the mould.

(7) Dross defects are minimized when the coal-dust content of a green-sand mould is less than 4 per cent. or greater than 6 per cent., and also if the moisture content of a green-sand mould is reduced.

(8) The tendency of dross defects to occur is less in a green-sand mould than in a dry-sand mould, CO_2-process mould, cement-sand mould or in an oil-bonded coresand mould.

(9) The application of a blacking wash to a dry sand mould reduces the incidence of dross defects.

(10) The use of a silicon/manganese/zirconium alloy as an inoculant reduced the amount of dross formed, compared with the use of calcium silicide and ferro-silicon as inoculants.

(11) Ladle additions of kish graphite and aluminium do not satisfactorily inoculate nodular irons.

Gypsum and Anhydrite, by A. W. Groves, D.Sc. Published for the Overseas Geological Surveys, Mineral Resources Bureau, by Her Majesty's Stationery Office, York House, Kingsway, London, W.C.2; price 7s. 6d. net.

Whilst the foundry industry uses quite large quantities of gypsum as plaster of Paris—and in other forms for making patterns and patternplates—this book only mentions these applications in one short paragraph. Yet in fairness, taking into consideration the scope of the book, this is all that can be expected. The book opens with an excellent description of the properties of the two minerals; their winning, preparation and beneficiation. Then the uses of the various types are detailed, especially in agriculture and building. The section on storage of gypsum plasters sets out optimum conditions. The second half of the book deals with deposits in the United Kingdom, Commonwealth territories and other countries. The publication should find a useful place in the technical libraries of foundries and the firms manufacturing supplies for this industry.

British Welding Research Association, Thirteenth Annual Report. Issued by the Association from 29, Park Crescent, London, W.1.

The foundry industry knows only too well of the great progress that has been made by the welding process since the inception of the Welding Research Association. In the early days, most of the energies of welders were devoted to the repair of broken engineering components, but since then welding has become a major factor in the construction of buildings and machinery. The attention of the Research Association is nowadays devoted to fundamentals and design,

Publications Received

the metallurgy and strength properties of welds. This report is presented—with good effect—in a rather "gayer" make-up than are the majority of such publications, but the reviewer would not like to see this evolution proceeding too far.

Supervision Management's Vital Link. Report of regional conferences, published by the Institute of Industrial Supervisors, 24, Albert Street, Birmingham 4; price 7s. 6d.

The reviewer found this 78-page book rather boring, possibly because it covers a number of regional conferences where the same ground was covered over and over again. The average foreman resents the whittling down of his authority. He knows that it is his job to implement management's policy, but hates to hear from the shop steward of decisions taken, instead of hearing direct from the firm's higher executives. There is one good feature of this booklet, it certainly does inform management of the current opinions held by foremen and the former would be well advised to purchase a copy for study.

Newsletter, Vol. 10, No. 8. Published by the David Brown group of companies, Huddersfield.

This issue reports the retirement at the age of 67 of Mr. Herbert Hindle, who, a patternmaker by trade, has in recent years been working as a pattern-checker at the Penistone works. He started his career with Mr. Brown, the founder of the David Brown concern, when the latter was operating a master-patternmakers shop. Mr. Hindle was the recipient of a number of presents from the firm and his colleagues to mark his retirement.

Bulletin of the European Community for Coal and Steel, Vol. 5, No. 6. Published from 23, Chesham Street, London, S.W.1.

This issue reports the proceedings of the European Community's Parliament, the headquarters of which are in the future to be located in Brussels, and not Strasbourg. This report should be read by all business men interested in the European Common Market.

Book Review

Cores and Coremaking, by Francis D. Roper. Published by George Allen & Unwin, Limited, Ruskin House, 40, Museum Street, London, W.C.1; price 21s. net.

For the purchase of books not generally available in the shops or on the stalls, the reviewer believes that all publishers should state, in addition to the net price, that of the post-free cost. In this case, it is 21s. 10d.

This is the second book from the pen of Mr. Roper and there is a distinct improvement in the literary style, consequent no doubt on added experience. Wisely, in his introduction, he states that "the more the foundryman is able to learn about the different aspects of his work, the better will be his craftsmanship." This book is a simple, practical statement of what is currently being carried out in the coreshops of this country. Using very clear line-drawings, a description of the various types of coreboxes is given. Then follows a chapter on types of cores and, on page 25, there is a good picture of a mould, mainly made up of cores, for a heavy-steel casting, and by contrast, a poor photograph of a rather similar one for an iron casting. The latter could have been omitted with no detriment to the text.

The reviewer regrets that the use of horse-manure in core-sand mixers, whilst not exactly recommended, is not soundly condemned as it should be in these enlightened days, as there are plenty of reliable substitutes. It is quoted as an ingredient in four of the typical mixtures tabulated. Yet this chapter contains some well-reasoned and sound advice, and the notes on the use of zircon sand are particularly welcome. Another good section is that dealing with cold-setting corebinders. Chapter IV, "Coremaking Technique," is unquestionably one of the best contributions ever made on this subject. It covers quite a wide field, whilst the next chapter on "Drying, Dressing and Assembling" is very informative and includes both small and large jobs.

The reviewer likes the author's choice of the word "cradles" for the devices employed for handling cores in the "green" state, as the word "driers" is technologically unsound when applied here. Chapter 7 is devoted to "Coreblowing" and here the author has discarded the word "cradle" for "shells," a word to which little objection can be taken except by the translator into foreign languages, when confusion with both die-casting and the Croning process could occur. There is much sound advice given in this chapter, also. Finally, the author deals with shell cores and CO_2 coremaking practice; here, unfortunately, the two illustrations used in connection with the latter add but little to the value of the book.

The book is well printed and well bound and the reviewer deems it to be a valuable addition to the literature of practical foundrywork.

V. C. FAULKNER.

House Organs

Nickel Bulletin, July 1958. Issued by Mond Nickel Company, Limited, Thames House, Millbank, London, S.W.1.

The increasing technical importance of the theory of magnetism and the properties and uses of magnetic materials is reflected in the papers presented to the third international conference on this subject, held in 1957. Abstracts showing the scope of the respective sessions of the conference form one of the main features of the July issue of the *Nickel Bulletin*: notes on more than 30 papers relating to nickel and nickel/iron alloys indicate the significance of such materials in that field.

Of general interest is the quarterly review of Patents, which, in this issue, contains more than 40 items. The subject matter of the patents covers a wide field, ranging over plating solutions, heat- and corrosion-resisting materials, heat treatment of steel, welding electrodes, and the prevention of tarnishing of nickel-silver in detergent cleansing solutions. The literature of heat- and corrosion-resisting materials is represented *inter alia*, by abstracts of papers reviewing oil-ash corrosion in gas turbines, the properties of nickel-base alloys for aeronautical applications, the influence of irradiation on the properties of nickel-containing materials and the corrosion-resisting characteristics of nickel alloys as affecting their use in atomic-energy applications.

Turnbridge News. The house organ of W. C. Holmes & Company, Limited, Turnbridge, Huddersfield, in its summer issue reports the death of Mr. L. Ward, who was patternshop foreman for 16 years. He spent the whole of his working life, starting at the age of 14, with the company.

News in Brief

THE BUILDING TRADES EXHIBITION which is to be held at City Hall, Deansgate, Manchester, from October 14 to 25, is scheduled to be opened by the Rt. Hon. Hugh Molson, M.P., Minister of Works.

THE FILM UNIT of Brook Motors, Limited, Huddersfield, have recently released a new 15-minute colour film "More For Your Money," which introduces a new design of electric motor, the "C" type, to British Standard 2960:1958.

AVERAGE SELLING PRICES (calculated to the nearest 10s.) for the four weeks ended August 8 of members of the Association of Light Alloy Refiners and Smelters were:—LM1, £146 per ton; LM2, £153; LM4, £170 10s.; LM6, £188 10s.

BOROUGH POLYTECHNIC, Borough Road, London, S.E.1, announce a course of ten lectures on "Refractories, their Manufacture, Properties and Applications," to be given by Mr. L. R. Barrett, M.A., B.SC., on Fridays at 7.00 p.m., commencing October 10.

SUBSTANTIALLY LOWER PRICES for Araldite epoxy resins have been announced by CIBA (A.R.L.), Limited (formerly Aero Research, Limited). The reductions have followed immediately upon the completion of a new epoxy-resin factory at Duxford with a greatly increased production capacity.

GERMAN iron and steel works have reduced the price of pig-iron supplied to open-hearth steelmakers by 10 per cent. to DM 275 (about £23 12s.) per ton. Steel alloy and special steel prices have also been reduced, mainly by way of lower extras. It is hoped that the pig-iron price cut will encourage steelmakers to use less steel scrap and consequently buy more coal.

CLAY CROSS COMPANY, LIMITED, near Chesterfield, has ceased pig-iron production for the first time since 1846. The blast-furnace unit is being partly demolished and 100 blast-furnace workers and ancillary staff have been declared redundant. The company was founded by George Stephenson, the railway pioneer. The company's foundry and spun plants are continuing in full production.

BAILIE M. MCMANNUS speaking of the need for stricter control of trading in scrap metal at Dundee magistrates committee on September 10, said he believed that too many brokers were licensed to deal in this material, and this was an encouragement to people who came by scrap in an illegal manner. If fewer people were entitled to deal in scrap metal the whole business would be much easier to control.

AWARDS TOTALLING £155 have been made to six employees of Richard Thomas & Baldwins, Limited, under the firm's new "jackpot" suggestion scheme. A £30 prize went to Mr. E. Davies, of the mechanical maintenance department at Cwmfelin for a suggestion concerning the use of a cradle jig for shotblasting ammunition boxes. Adjudication for the three best suggestions of the year will take place early on next year.

THE SCOTTISH INDUSTRIES FAIR, which is to be held in Glasgow in September next year, is intended to present a "shop window" of Scotland to the world. Sir Robert Maclean, chairman of the exhibition, outlining plans for the fair said it would be an all-Scottish occasion, with the purpose of drawing the attention of Governments, trade buyers and the general public to the wide and increasing range of Scottish quality products.

MORGAN CRUCIBLE COMPANY, LIMITED, Battersea Church Road, London, S.W.11, will be amongst those exhibiting at the Electro-heat and Productivity Exhibition, to be held at Kelvin Hall, Glasgow, from November 10 to 14. The company will be showing (*Stand No. 32*) their Crusilite silicon-carbide furnace-heating element, which can be used in all element temperatures up to 1,575 deg. C. and has proved its value in many fields.

Dr. LLYWELYN ROBERTS, Sheffield Medical Officer of Health and a member of the Clean Air Council, will give a review of reports from the divisions on the second day of the three-day conference of the National Society for Clean Air at Llandudno, in October. Delegates from Sheffield and District Clean Air Committee will be Mrs. P. Sheard, chairman, Sheffield and district committee, Councillor C. C. Newsholme, Rotherham Urban Council, and Mr. J. W. Batey, superintendent smoke inspector.

A 79-TON LOAD left the Davy and United Engineering Company's Darnall Works, Sheffield, on September 10, for the Abbey Works at Margam of the Steel Company of Wales. It was a gearbox and is among the 1,600 tons of castings for a universal slabbing mill which are to be transported. The 400-mile journey over police-supervized roads took seven days. When the heaviest parts of the new mill, the roll housings which weigh 130 tons, are transported, they will take 14 days to reach their destination.

A CLEAN AIR CAMPAIGN, organized by the Solid Smokeless Fuels' Federation, is being held in the West Riding from September 22 until April, when exhibitions and meetings will be held in 17 of the larger towns and cities. Exhibitors include the Yorkshire Electricity Board, the North Eastern Gas Board, the Coal Utilisation Council, the Directorate of Scientific and Industrial Research, and the Solid Smokeless Fuels Federation. The exhibition will start at Wakefield and end at Leeds.

THE NECESSITY TO STREAMLINE PRODUCTION of Twin Pioneer aircraft, made at the Prestwick factory of Scottish Aviation, Limited, Prestwick and Renfrew, has led to approximately 180 workpeople being made redundant with effect from September 26. Fitters are mainly involved, but nearly all departments are affected. The company's staff at Renfrew, who are engaged on aircraft maintenance work, are not affected. Between 2,500 and 2,700 persons are employed at Prestwick, and a further 800 at Renfrew.

A SMALL NUMBER of American professors of business administration and allied subjects are coming to Europe on short-term contracts by arrangements with the European Productivity Agency. Amongst those who will be staying in Britain are Professor M. H. Waterman, lecturer in financial management at the University of Michigan, who will be spending the autumn term at the Birmingham College of Technology, and Professor R. Clewett, Professor of Marketing in Northwestern University, who is to be based at the Polytechnic, Regent Street, London, W.1.

THE DIRECTORS of Frank Wigglesworth & Company, Limited, engineers, millwrights, Clutch Works, Hirst Wood, Shipley, last week entertained to dinner all employees of 35 years' service, or over, and their wives. Continuing the custom started last year, when there were 47 recipients, Mr. F. A. Stott, joint managing director, presented an inscribed gold watch to Mr. Duncan Foster, an inspector in the fitting and erecting department, and Mr. Harold Throup, of the maintenance department, on completing this length of service with the firm.

News in Brief

"THERE HAS BEEN A TENDENCY to glorify the resurrection of Germany and the wonderful achievements of Japan. It is true that Germany seems to have risen rapidly since the war, but we have held our place," said Mr. R. S. Fearnehough, president of Sheffield Chamber of Commerce, at the annual dinner of the Sheffield Area Industrial Group of the Royal Society for the Prevention of Accidents at the Cutlers' Hall, Sheffield, on September 12. He added, "I do think we could hold our place much better if there were more publicity given to Sheffield industries." Other speakers were Mr. C. H. M. Owen, director and works manager of the Staveley Iron and Chemical Company, Limited, Alderman A. Ballard, Deputy Lord Mayor of Sheffield, Mr. R. F. E. Stoney, deputy director general of the Society, and Mr. J. J. Hill, chairman of the Sheffield Area Industrial Group.

Obituary

HARRY S. BROOM

The death is announced on September 12, after a short illness, of Mr. Harry S. Broom, M.I.MECH.E., founder, chairman and joint managing director of Broom & Wade, Limited, High Wycombe, Buckinghamshire. Mr. Broom, who was in his 84th year, was born a member of a Norfolk farming family. A great future was predicted for him as he was the seventh child born on the seventh day of the seventh month. Due in no small measure to his inspiring leadership, his business grew from small beginnings in 1898 to a world-wide organization having subsidiary companies in South Africa, Australia and Canada, together with nearly 70 overseas agents. At the High Wycombe headquarters alone nearly 1,400 people are employed at present. Mr. Broom, whose portrait and biography appeared in the JOURNAL'S personality feature on September 1, 1955, issue, was a well-known and immensely popular figure in the yachting world and in the hunting field.

MR. SAMUEL THOMSON

By the death last week of Mr. Samuel Thomson, not only the board of Colvilles, Limited, but the British iron and steel industry has lost a man of considerable experience and one who took an active interest in furthering the craft of steelmaking, both in the practical and research fields. He was also general manager of Colvilles' Dalzell Works, Motherwell, a director and general manager of the Lanarkshire Steel Company, Limited, and a director of the Etna Iron & Steel Company, Limited, and the Steel Company of Scotland, Limited. A native of Kippen (Stirlingshire), Mr. Thomson was educated at the local school and Stirling High School. He started work in the Dalzell offices of David Colville & Sons, and was appointed bar mills manager in 1921 and mills manager in 1929. He subsequently became assistant works manager at the Dalzell Works and, in 1937, was appointed general manager of the Lanarkshire Steel Company, being elected to the board in 1947. In the same year he was made a special director of Colvilles and general manager of the Dalzell Works and became a full director of the parent company in 1951.

The death has occurred of Mr. HERBERT ERIC TOOGOOD, manager of the engineering section of the Humber St. Andrews Engineering Company, Limited, Hull. He was 54.

The death is announced of Mr. FREDERICK OSGOOD HICKLING, who had been technical manager of the Ransome & Marles Bearing Company, Limited, Newark-on-Trent, for the past 30 years. Mr. Hickling was an authority on ball and roller bearings and their application and also possessed a deep and instinctive understanding of sound engineering practice applied to any mechanical design.

The death occurred of Sir FREDERICK CHARLES YAPP. He was 78. Sir Frederick was associated with the Vickers organization for almost 50 years. He joined the ordnance department of Vickers Sons & Maxim, Limited, in January, 1902, and during his long association with the Vickers group he had been a director of many of the group companies, including chairman of Vickers-Armstrongs, Limited, from 1944 to 1946. He was appointed to the board of Vickers, Limited, in November, 1935, and to the office of managing director of that company in November, 1944. He relinquished that office on his retirement from executive duties in July, 1946. He remained, however, on the board of Vickers as a non-executive director until June, 1951. Sir Frederick was acting chairman of the English Steel Corporation, Limited, of which he was also a director, from 1940 to 1946. He was knighted in 1942.

Non-Ferrous Club

At the September meeting of the Non-Ferrous Club, held at the Queen's Hotel, Birmingham, the guest speaker was Mr. R. G. W. Plutte, managing director of London Zinc Mills, Limited. Commenting on his recent visit to America and Canada, he said that he went there expecting to find these countries well ahead in technical processes, but he found that although most American zinc-rolling firms were in advance of those in this country as far as the rolling of strip was concerned, in the rolling of sheet, UK methods were years ahead of those generally used in the USA. Comparing productivity he found that generally speaking Britain was 25 to 30 per cent. up on productivity per man/hour. In one respect the market differed; there was a very large American market for strip, and he thought that a similar market might be developed here. Regarding applications for zinc, American industry did not quite know where it was going, and they could learn from us and from the Zinc Development Association in this respect. There was, he said, much more direct selling in America and merchants were not so widely used, and, of course, ther was the "fixed price."

In Canada, he found business men interested in buying from the United Kingdom, but the market for zinc was localized around Toronto and Montreal and on-the-spot selling was essential. He thought the Canadian market was expanding and UK suppliers could beat those in the USA and reap substantial rewards if they could meet the new specifications which were being introduced. A collection taken at the meeting on behalf of the National Federation of Boys Clubs realized £16 10s. 0d.

Change of Meeting Date. London IBF members and particularly those attached to the Beds & Herts section are asked to note a change of date for the first meeting of the session. Instead of October 9, this will take place on Tuesday, October 7, the rest of the arrangements being unchanged. It is hoped that Mr. F. W. Rowe, B.Sc., managing director K & L Steelfounders and Engineers, Limited, will be able to address the meeting, at which the new president, Mr. G. A. Smith, will be inducted.

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Personal

Mr. E. L. TUFF, a director of the Projectile & Engineering Company, Limited, has been appointed general manager of the company.

Mr. G. MORRIS has been appointed foundry works manager of Head Wrightson Iron Foundries, Limited, a subsidiary of Head Wrightson & Company, Limited.

Mr. S. H. GRIFFITHS, head of John Thompson, Limited, group research laboratories, has been appointed a director of John Thompson (Wolverhampton), Limited.

Mr. GEORGE ABBOTT, a fitter with Thomas C. Fawcett, Limited, engineers, Hunslet, Leeds, has been presented with a gold watch by Mr. T. C. Fawcett, chairman, on his retirement at the age of 83, after 69 years' service with the firm.

Mr. WILLIAM CAMBRIDGE, an employee of Ardeer Foundry, Stevenston, Ayrshire, has been presented with the British Empire Medal on behalf of the Queen by Lt.-Comdr. G. T. Hughes-Onslow, Lord Lieutenant of Ayrshire. He has been 64 years in the foundry.

Mr. H. S. AXTON, assistant secretary of the Midland Employers' Mutual Assurance, has been appointed secretary and chief accountant as from October 1. Mr. Axton succeeds Mr. H. N. HOUGHTON, who will retire at the end of this month after 20 years with the company.

Sir CHARLES MORRIS, vice-chancellor of Leeds University, presented prizes and bonus awards for further education to works apprentices and girl students of Newton Chambers & Company, Limited, Business Training College, Thorncliffe, at the Newton Hall, Chapeltown, Sheffield, on September 9.

Mr. OLIVER GREGORY, export sales manager of Griffin & George (Sales), Limited, laboratory furnishers, of Wembley (Middx), who earlier this year toured central Europe, is now touring the northern countries, calling on the group's agents in Germany, Denmark, Finland, Sweden, and Norway.

Mr. J. A. HIGHAM, manager of the north-eastern division of Shell-Mex & B.P., Limited, retires at the end of this month after 39 years' service to the oil industry. Mr. Higham, who joined the industry at the age of 21, will be succeeded by Mr. E. RENDALL, previously sales manager of Scottish Oils & Shell-Mex, Limited.

Birfield Industries, Limited, announces the appointment of Mr. G. W. KELLAND as public relations officer of the Birfield group from October 1. He will be located at the group's head office at Stratford House, Stratford Place, London, W.1. Mr. Kelland has been editor of the *Transport Journal* for five years.

Mr. F. J. E. TEARLE, a director of Associated Electrical Industries, Limited, and managing director of Associated Electrical Industries (Overseas), Limited, has been presented with a silver tankard in recognition of 35 years' service with the group. The presentation was made by Viscount Chandos, chairman of A.E.I.

Mr. ALEXANDER M. ADAMSON, chief engineering estimator of the Caledon Shipbuilding & Engineering Company, Limited, Dundee, has retired after more than 60 years in the service of the company. He began his apprenticeship with the company's Lilybank Foundry in 1897 and has since helped in the building of nearly 400 ships.

Mr. WALTER SCHEVENELS, Belgian secretary of the European regional organization of the International Confederation of Free Trade Unions, is to visit Birmingham on November 8, when he will be chief speaker at a one-day school on "Trade Unions and European integration" organized by Birmingham University Extra Mural Department.

Mr. E. PLAYER, deputy chairman and managing director of Birmid Industries, Limited, and a director of Midland Motor Cylinder Company, Limited, and Mr. F. A. W. LIVERMORE, who has for the last five years been works director of the latter company, have been appointed joint managing directors of the Midland Motor Cylinder Company, Limited.

Mr. ALFRED J. NICHOLAS, managing director of South Wales Switchgear, Limited, was on September 5 installed as president of the South Wales branch of the Incorporated Sales Managers' Association. He is now in Montreal—where his company has a factory—to attend the opening of the World Power Conference. He will travel extensively in the US before going to Venezuela and visiting a large oil project for which South Wales Switchgear recently won a £1,000,000 order. Mr. Nicholas will return home via Trinidad, Cuba, and Brazil.

The enthusiastic response, particularly from the US, which followed the introduction of the Goodyear pump by the Holman Bros., Limited, group, early this year, is being followed up by Mr. E. H. CURRY, sales manager of Goodyear Pumps, Limited, who is making a tour of the American eastern seaboard. Tests to show the pump's performance in relation to special needs will be carried out. Before returning to England, Mr. Curry will visit the headquarters of Holman Bros. (Canada), Limited, which acts for Goodyear Pumps in Canada.

MR. WILLIAM H. MCFADZEAN, chairman and managing director of British Insulated Callender's Cables, Limited, has been elected deputy president of the Federation of British Industries. He is also chairman of other companies in the BICC group. As vice-chairman and industrial leader of the Advisory Council on Middle East Trade, Mr. McFadzean recently toured the Middle East. He is a member of the Ministry of Labour's Advisory Board which has been concerned with the resettlement of ex-regular officers, and a member of the council of the Institute of Directors.

Relaxation in the Hire-purchase and Hiring Controls

The Board of Trade announce amendment of the Hire-Purchase and Credit Sale Agreements (Control) Order, 1957,* and of the Control of Hiring Order, 1957†, with effect from September 16.

A wide range of goods has been released from the hire-purchase control. They include industrial plant and agricultural equipment; lorries, buses and heavy vans; caravans; motor cycles and bicycles; together with furniture, carpets, cookers, and other items for which a statutory minimum deposit of 20 per cent. was formerly payable, when they were bought under an instalment agreement.

The minimum deposit on all goods remaining in the control will stand at 33⅓ per cent.: these include radio and television sets, domestic appliances and motor cars. The maximum repayment period for agreements for all these goods will be two years.

* Hire-purchase and Credit-sale Agreements (Control) (Amendment No. 2) Order, 1958 (S.I. 1958 No. 1512), and † Control of Hiring (Amendment) Order, 1958 (S.I. 1958 No. 1513). Copies of both these Orders are obtainable from H.M. Stationery Office, Kingsway, London, W.C.2, and branches, price 3d. each (by post 5d.).

Forthcoming Events

SEPTEMBER 18

Institute of British Foundrymen

Birmingham branch :—"Continuous Casting Process as Applied to Cast Iron," by H. F. Morris, 7.15 p.m., at the James Watt Memorial Institute, Great Charles Street, Birmingham, 3.

Institute of Vitreous Enamellers

Northern section : "Heat-resisting Coatings using the Rockité Method," by E. D. Teague, 7.30 p.m., at the Old Nags Head Hotel, Jackson's Row, Deansgate, Manchester.

SEPTEMBER 19

Institute of British Foundrymen

Bristol and West of England branch : "Any Questions," 7.30 p.m., at the Royal Hotel, Bristol.

SEPTEMBER 25

Incorporated Plant Engineers

Sheffield and district branch : "Hydraulics," by F. H. Towler, 7.30 p.m., at the Grand Hotel, Sheffield.

SEPTEMBER 26

Incorporated Plant Engineers

Birmingham branch : "Planned Maintenance," by A. F. R. Stedman, 7.30 p.m., at the Imperial Hotel, Temple Street.

Contracts Open

*The dates given are the latest on which tenders will be accepted. The addresses are those from which forms of tender may be obtained. Details of tenders with the reference ESB can be obtained from the Board of Trade Export Services Branch, Lacon House, Theobalds Road, London, W.C.*1 *(telephone: CHAncery* 4411, *ext.* 738 *or* 771), *unless otherwise stated.*

LANCASHIRE, September 29—Supply of manhole-cover and gully-grate castings, etc. Documents from the county surveyor, County Hall, Preston (P.O.B. 9). (Ref. 99/51.)

HALSTEAD, October 9—Provision of 2,700 yd. of 6-in. spun-iron rising main. Documents from the offices of the engineers, John Taylor & Sons, Artillery House, Artillery Row, Westminster, S.W.1.

BOURNEMOUTH, September 30—Supplying and delivering 150 cast-iron lighting columns, and brackets. Documents from the borough engineer, Town Hall, Bournemouth.

HAVANT, September 15—Supply of 79 cast-iron columns, and brackets. Documents from the engineer and surveyor, 1, Park Road North, Havant, Hants.

SOUTH AFRICA, October 9—Gloves, gauntlets and goggles. (ESB/22324/58.)

PAKISTAN, October 7—Requirements include pig-iron, coke quality sand-moulded or machine-cast standard foundry No. 1 and No. 3. (ESB/22466/58.)

GREECE, October 7—Foundry crucibles. (ESB/13007/57.)

WESTERN GERMANY—Odenbach-Grosshandel GmbH, Krefeld, Vereinstrasse 46, have advised the British Consulate-General at Dusseldorf that they wish to represent United Kingdom manufacturers of equipment and supplies for commercial laundries and dry cleaning establishments. They already import laundry presses from the United Kingdom. (ESB/21077/58.)

PAKISTAN, October 6—Deep-well turbine vertical design pumps. (ESB/21033/58.)

SOUTH AFRICA, October 2—Electric furnace. (ESB/20958/58.)

Recent Wills

GOUGH, W. J., founder and a director of Coseley Brass Foundry, Limited, Coseley, Bilston (Staffs) £26,661

PICKERSGILL, W. J., former chairman of William Pickersgill & Sons, Limited, ship builders and repairers, of Sunderland £13,207

OLDING, H. J. D. (or Jack), founder and president of Jack Olding & Company, Limited, manufacturers of agricultural tractors, earth-moving equipment, etc., of Hatfield (Herts) £494,680

SLATER, MAURICE, late chairman of C. & L. Hill, Limited, non-ferrous founders, etc., of Willenhall, and the Central Patternmaking Company, Willenhall, formerly managing director of John Harper & Company, Limited, Willenhall, ironfounders, etc., and a director of other companies ... £50,159

WILSON, DOUGLAS, publicity manager of the United Steel Companies, Limited, and president of the European Federation of Petroleum Equipment Manufacturers £3,732

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* Economical
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* Rigid
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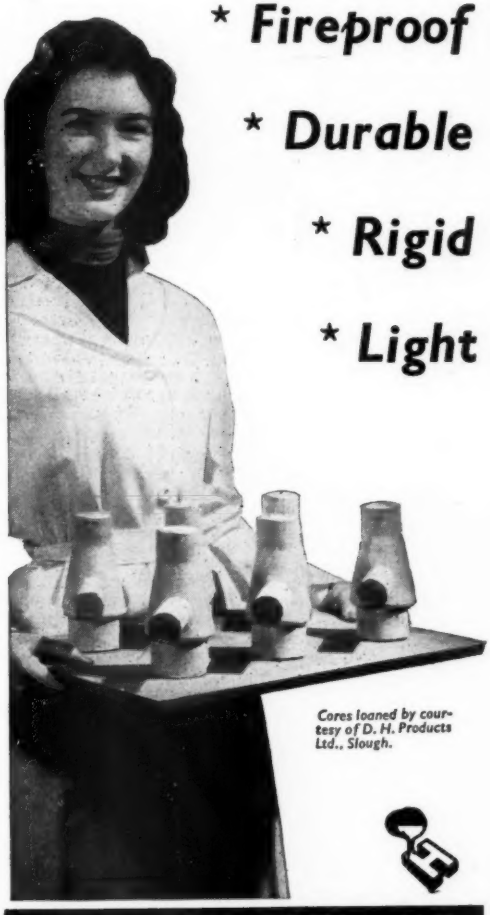

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Raw Material Markets

Iron and Steel

All the ironfoundries are in need of more work. Orders for many types of castings are scarce and insufficient to keep plants fully employed. There is keen competition for the business arising, and, in order to maintain production, orders are being accepted at cut prices. Even so, many establishments continue to work short time. Some of the foundries have been less affected by the shortage of work than others, but the recession is concerning most producers of castings.

Demands for automobile and other high-quality castings are on a much better scale than for ordinary grey-iron castings, and although demands for the former have declined, the foundries producing these continue to be much better employed than others. The motor vehicle trade, while not specifying so heavily at present, is still taking up appreciable quantities and an improved demand is likely to be forthcoming shortly. There are signs also that the machine-tool industry will be increasing its call for castings, and these demands, coupled with the requirements of many other large and equally essential users of high-duty castings, ensure the continuance of appreciable outputs from the engineering and speciality foundries. An improvement in trade would be welcome at the light foundries, which have been very quiet for a long time. It is hoped that this will be accomplished by the improved credit and financial arrangements. The textile foundries are also short of work and many of the jobbing foundries have spare capacity.

All grades of pig-iron are plentiful. The low-phosphorus irons remain in chief demand. Appreciable quantities are being absorbed; with the increased supplies now available, however, difficulty is experienced by the makers in disposing of their outputs. Hematite, of which fairly large quantities are being used by the engineering foundries, is in good supply and the refined irons are also adequately available. Demands for the high-phosphorus irons show little improvement and the reduced outputs now being obtained are more than sufficient to meet requirements.

Home steelworks are able to meet comfortably the demands for steel semis and could increase supplies if called for. Trade, however, at the re-rollers, is insufficient to enable them to take up increased supplies of billets, etc., and the stocks on hand are still being used for the orders which arise. Business continues scarce for most of the products of the re-rollers, and although there has been a slight improvement in some areas for small bars and light sections, the orders available are not of such proportion as to improve appreciably the current outputs. With the lower prices quoted by overseas makers, export business is still very difficult to obtain, apart from Siemens and special quality steels.

Non-ferrous Metals

The position and prospects for copper at the moment are confused. The outlook began to become obscure early in August when Kennecott increased its annual rate of output by about 65,000 tons. At that time demand was only fair and the price was having a hard time holding around 26 cents a pound so that the decision to raise output came as a mixture of surprise and shock. Nevertheless, there were grounds for thinking that the Minerals Subsidy Bill would be approved, in which case the US stockpile would absorb 150,000 tons of the red metal. Subsequently Kennecott again raised its rate of production and, despite the fact that the Minerals Subsidy Bill was rejected, nothing was done to reverse the decision. Indeed, Phelps-Dodge joined in and raised its production as well. The reaction in the New York market was relatively slight, although a small drop was made in the quotation of both the custom smelters and the primary producers. Since that time the custom smelter price has been raised to 26¼ cents, while the primary producers have held their quotation at 26½ cents a pound. All this against the background of a weak market and one which it was said required an offtake of at least 150,000 tons of copper to achieve stability have made the present position unclear to say the least.

There is, of course, the view that the US recovery is showing sufficient signs of recovery to anticipate a much larger demand in the months ahead. On this basis the raising of production would then be interpreted as imparting stability to the market and preventing runaway prices. As a corollary it can be said that this action would prevent the return of the many marginal producers, who would then be in a position to swamp the market with metal. The theory here is better than the reality, which is that copper stocks are at record high levels and that demand schedules would have to be altered considerably before much impression could be made on whittling the stocks down to manageable proportions. There is a third view which can be predicated on the belief that the US is not as well prepared for emergency operations as are the Russians and with growing international tension the US can ill afford to have a dying minerals industry on its hands. This implies that something will yet be done to inject more life into the US mining industry.

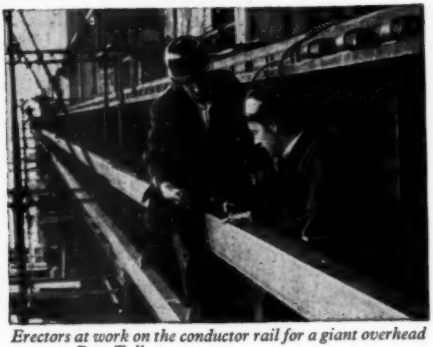
In the UK the copper price is steady, with consistently large turnovers being the feature. Tension in the Far East has helped to maintain prices as have the steps leading up to the strike of the European Mineworkers' Union on the Rhodesian Copperbelt. How serious is this strike remains to be seen. Certainly, if the union withholds its labour for any length of time the mines on the Copperbelt will close down. In this event, the copper price could advance sharply on bad news from the Far East, further concrete evidence of the American economic recovery or the actual entry into the market of the Soviet block for appreciable tonnages. Meanwhile, the United Nations meeting in London last week, after three days of deliberations, announced that there was no need at this time for any intergovernmental action on the metal.

Tin is still an undecided market. Immediately following the Board of Trade announcement that imports of Russian tin would be on a quota and for the first three months the tonnage would be limited to 750 tons, the market rose sharply. But second thoughts prevailed with the belief emerging that Russia would manage to dump her available tin on the market somewhere somehow. This, together with the news that Japan would consider switching her purchases of tin from Malaya to Russia, undermined the market with the result that the cash price has had to be supported on several days at the support price of £730 a ton, while the three months' price went down to well below the floor price for cash metal. Recently, however, the situation has eased somewhat as selling has abated and the announcement has been made that Japan would still continue to buy more tin from Malaya than from elsewhere. Even so, this answer is only partly satisfactory and the fact that Japanese traders can purchase tin from any source without Government restriction is causing real concern in Malaya. On the other hand, inquiry from the US has broadened and the New York price is better than 95 cents a pound. Taking a broad view the real

(*Continued on page 368*)

At Port Talbot The Steel Company of Wales is building a new Bessemer shop in which the latest oxygen-blowing techniques will be used. This construction man is standing on its second highest girder.

The steel erection foreman and the consulting engineer are in close contact all day, every day.



Erectors at work on the conductor rail for a giant overhead crane at Port Talbot.

STEEL . . . The big build-up goes on

For new works, new plant, the Steel men are spending £100 million in 1958

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Make no mistake, Britain's prosperity depends on getting the answers right.

Plans for expanding steel production hinge not only on forecasting the growth of Britain's economy as a whole. They depend on forecasting what each steel using industry will need – the makers of cars, ships, refrigerators, tins, buildings, machinery.

A stiff problem. Whose job is it to find the answer?

WHO DECIDES?

The Iron and Steel Board (an independent body appointed by the Government to supervise the Steel Industry) reviews the future demand for steel, in consultation with Government Departments and the Steel Industry and with consumers.

According to the expected demand, plans for new plant are worked out within the industry. If any individual scheme calls for more than £100,000, it must be put before the Board for sanction. The companies are responsible for finding the money. But it is up to the Board, in consultation with the Government, to ensure that the industry's plans meet the nation's needs.

So we get the best of both worlds – private enterprise and public supervision.

PRESSING ON

The system has worked well. Overall steel production is now ahead of demand. But even if demand had not fallen we would still be able to balance our steel "account".

In this situation an industry might be expected to hold up investment. But the Steel Industry believes that the nation's economy will continue to expand. So, with the approval of the Board, the industry's great building programme is going ahead. In 1958 alone, it will cost over £100 million – the largest sum ever spent by the industry in one year. Steel-making capacity is to be increased to about 29 million tons by the early 1960's.

The Steel Industry believes in Britain's future. Under the Board's supervision it is planning and building for the years ahead.

ISSUED BY THE BRITISH IRON AND STEEL FEDERATION

Current Prices of Iron, Steel, and Non-ferrous Metals

(Delivered unless otherwise stated)

September 17, 1958

PIG-IRON

Foundry Iron.—No. 3 IRON, CLASS 2: Middlesbrough, £21 6s. 0d.; Birmingham, £20 18s. 3d.

Low-phosphorus Iron.—Over 0.10 to 0.75 per cent. P, £23 17s. 0d., delivered Birmingham. Staffordshire blast-furnace low-phosphorus foundry iron (0.10 to 0.50 per cent. P, up to 3 per cent. Si), d/d within 60 miles of Stafford, £24 1s. 3d.

Scotch Iron.—No. 3 foundry, £25 3s. 6d., d/d Grangemouth.

Cylinder and Refined Irons.—North Zone, £25 19s. 0d.; South Zone, £26 1s. 6d.

Refined Malleable.—P, 0.10 per cent. max.: North Zone, £27 6s. 6d.; South Zone, £27 9s. 0d.

Hematite.—Si up to 2 per cent., S. & P. over 0.03 to 0.05 per cent.: N.-E. of England (local iron), £25 6s. 6d.; Scotland (Scotch iron), Zone S.1, £25 13s. 0d.; Sheffield, £26 15s. 0d.; Birmingham, £27 4s. 0d.; Wales (Welsh iron), £25 6s. 6d.

Basic Pig-iron.—£20 3s. 0d., delivered Staffs, Derbyshire, Notts, Lincs, Rutland, Northants, and Leics.

FERRO-ALLOYS

(Per ton unless otherwise stated, delivered)

Ferro-silicon (6-ton lots and over).—45 per cent. Si, £44 0s. 0d. to £44 10s. 0d., scale 15s. 0d. per unit; 75 per cent. Si, £62 0s. 0d. to £62 10s. 0d., scale 17s. 0d. per unit.

Ferro-vanadium.—50/60 per cent., 22s. 6d. per lb. of V.

Ferro-molybdenum.—65/70 per cent., carbon-free, 12s. 6d. per lb. of Mo.

Ferro-titanium.—20/25 per cent., 2-3 per cent. Cu, £250 0s. 0d.; 38/40 per cent., commercially carbon-free, £287 0s. 0d.

Ferro-tungsten.—80/85 per cent., 6s. 6d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 9s. 6d. per lb. of W.

Ferro-chrome (6-ton lots and over).—4/6 per cent. C, £83 10s. 0d. to £87 0s. 0d., basis 60 per cent. Cr, scale 30s. 0d. to 30s. 6d., per unit; over 6 per cent. C, £79 10s. 0d. to £85 0s. 0d., basis 60 per cent. Cr, scale 30s. 6d. per unit; 2 per cent. C,* 2s. 0d. per lb. Cr; 1 per cent. C,* 2s. 0½d. per lb. Cr; 0.15 per cent. C,* 2s. 1½d. per lb. Cr; 0.10 per cent. C,* 2s. 1¾d. per lb. Cr; 0.06 per cent. C,* 2s. 2d. per lb. Cr.

Metallic Chromium.—98/99 per cent., 6s. 10d. per lb.

Metallic Manganese.—94/96 per cent., carbon-free, £265 0s. 0d.; 96/98 per cent., £295 0s. 0d.

Ferro-columbium.—65/72 per cent., Nb + Ta, 19s. 9d. per lb., Nb + Ta.

Ferro-manganese (home).—78 per cent., £78 0s. 0d.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—BASIC: Soft u.t., £32 15s. 6d.; tested, 0.08 to 0.33 per cent. C, £33 15s. 6d.; hard (0.41 to 0.60 per cent. C), £34 17s. 0d.; silico-manganese, £43 16s. 6d.; free-cutting, £36 14s. 6d. SIEMENS MARTIN ACID: Up to 0.25 per cent. C, £41 1s. 0d.; silico-manganese, £44 4s. 0d.

* Average 68-70 per cent.

Billets, Blooms, and Slabs for Forging and Stamping.—Basic, soft, up to 0.33 per cent. C, £38 10s. 0d.; basic, hard, over 0.41 up to 0.60 per cent. C, £39 12s. 6d.; acid, up to 0.25 per cent. C, £43 4s. 0d.

FINISHED STEEL

Heavy Plates and Sections.—Ship plates (N.-E. Coast), £42 2s. 0d.; boiler plates (N.-E. Coast), £44 12s. 0d.; floor plates (N.-E. Coast), £43 11s. 0d.; angles (N.-E. Coast), £39 16s. 6d.; joists (N.-E. Coast), £39 12s. 6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in., and flats 5 in. wide and under, untested soft basic, 50 tons and over, £40 0s. 6d.; under 10 tons to 4 tons, £40 18s. 0d.; under 4 tons to 2 tons, £41 3s. 0d.; hoop and strip, coils, £39 0s. 0d.; uncoated strip mill coils, hot rolled, under 3mm. to 12g., £44 16s. 0d.; black sheets (hand mill), 24g., £58 14s. 6d.; galvanized corrugated sheets, 24g., £66 16s. 0d.

Alloy Steel Bars.—1 in. dia. and up: Nickel, £68 10s. 0d.; nickel-chrome, £99 11s. 0d.; nickel-chrome-molybdenum, £111 19s. 0d.

NON-FERROUS METALS

Copper.—Cash, £212 10s. 0d. to £212 15s. 0d.; three months, £213 0s. 0d. to £213 5s. 0d.; settlement, £212 15s. 0d.

Copper Tubes, etc.—Solid-drawn tubes, 1s. 11¾d. per lb.; rods, 220s. 0d. per cwt. basis; 20 s.w.g., 253s. 3d. per cwt.

Tin.—Cash, £730 0s. 0d. to £730 10s. 0d.; three months, £730 0s. 0d. to £730 10s. 0d.; settlement, £730 10s. 0d.

Lead (Refined Pig).—Second half September, £71 15s. 0d. to £72 0s. 0d.; second half December, £73 0s. 0d. to £73 2s. 6d.

Zinc.—Second half September, £66 0s. 0d. to £66 5s. 0d.; second half December, £66 5s. 0d. to £66 7s. 6d.

Zinc Sheets, etc.—Sheets, 15g. and thicker, all English destinations, £99 2s. 6d.; rolled zinc (boiler plates), all English destinations, £96 17s. 6d.; zinc oxide (Red Seal), d/d buyers' premises, £87 0s. 0d.

Brass Tubes, etc.—Solid-drawn tubes, 1s. 7¼d. per lb.; sheets to 10 w.g., 174s. 3d. per cwt.; wire, 2s. 5d.; rolled metal, 174s. 3d. per cwt.

Brass (Brazing).—BS1400, B3 (65/35), £139; B6 (85/15), —; BS249, —.

Brass (High Tensile).—BS1400, HTB1 (30 tons), £166; HTB2 (38 tons), —; HTB5 (48 tons), £195.

Gunmetal.—BS1400, LG2 (85/5/5/5), £171; LG3 (86/7/5/2), £179; G1 (88/10/2/½), £239; (88/10/2/1), £229.

Phosphor Bronze.—BS1400, PB1 (AID released), £258 per ton.

Phosphor Bronze Strip, etc.—Strip, 256s. 6d. per cwt.; wire, 3s. 9½d. per lb.; rods, 3s. 0¾d.; tubes, 3s. 0¾d.; chill cast bars: solids 3s. 0¼d.; cored 3s. 1¼d. (CHARLES CLIFFORD, LIMITED.)

Nickel Silver, etc.—Rolled metal, 3 in. to 9 in. wide x 0.056, 3s. 7d. per lb.; round wire, 10g. in coils (10 per cent.), 3s. 11¾d.; special quality turning rod, 10 per cent., ½ in. dia., in straight lengths, 3s. 10¾d. All prices are net.

Other Metals.—Magnesium, ingots, 2s. 5½d. per lb. Antimony, English, 99 per cent., £190 0s. 0d. Quicksilver, ex-warehouse, £79 0s. 0d. Nickel, £600 0s. 0d. Aluminium ingots, £180 0s. 0d.; aluminium bronze (BS1400), AB1, £214; AB2, £230.

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Pig-iron and Steel Production

Statistical Summary of July Returns

The following particulars of pig-iron and steel produced in Great Britain are from statistics issued by the British Iron and Steel Federation. Table 1 summarizes activities during recent months. Table 2 gives production of steel ingots and castings in July. Table 3, weekly average production of finished steel in June. Table 4 gives the production of pig-iron and ferro-alloys in July, and furnaces in blast. (All figures are weekly averages in thousands of tons.)

TABLE 1.—*Iron and Steel Price Index and General Summary of Pig-iron and Steel Production.*

Period.	B.o.T. Price Index, 1938 = 100.			Iron-ore output.	Imported ore used.	Coke sent to blast-furnaces.	Pig-iron, ferro-alloys prod.	Scrap used in steel prod.	Steel (incl. alloy).			
	Iron and steel.	Coal.	Basic materials excl. fuel[1]						Imports.[2]	Prod. ingots, castings.	Delivrs. finished steel.	Stocks.[3]
1956	296	453	542	312	272	264	253	216	27	397	318	1,444
1957	328	488	537	325	303	270	275	220	14	417	322	1,444
1958—April[4]	341	506	479	270	291	243	257	218	11	408	303	1,606
May ..	342	496	476	271	266	229	250	202	9	379	295	1,579
June ..	342	497	478	274	258	222	243	201	8	374	303	1,543
July[4]	342	497	477	256	235	209	227	165	9	316	—	1,623

TABLE 2.—*Average Weekly Production of Steel Ingots and Castings in July*, 1958. (*Thousands of Tons.*)

District.	Open-hearth.		Bessemer.	Electric.	All other.	Total.		Total ingots and castings.
	Acid.	Basic.				Ingots.	Castings.	
Derbyshire, Leics., Notts., Northants and Essex	—	4.4	12.2 (basic)	1.7	0.1	17.2	1.2	18.4
Lancs. (excl. N.W. Coast), Denbigh., Flints. and Cheshire	1.7	34.3	—	2.3	0.3	37.6	1.0	38.6
Yorkshire (excl. N.E. Coast and Sheffield) ..								
Lincolnshire	—	35.7	—	—	0.1	35.7	0.1	35.8
North-East Coast	0.7	56.8	—	0.9	0.3	57.5	1.2	58.7
Scotland	1.3	25.2	—	1.5	0.1	26.6	1.5	28.1
Staffs., Shropshire, Worcs. and Warwicks ..	—	11.7	—	2.1	0.6	13.0	1.4	14.4
S. Wales and Monmouthshire	2.4	72.7	7.1 (basic)	0.7	0.1	82.6	0.4	83.0
Sheffield (incl. small quantity in Manchester) ..	7.5	18.5	—	7.7	0.2	32.5	1.4	33.9
North-West Coast	0.1	1.3	3.1 (acid)	0.5	—	4.8	0.2	5.0
Total	13.7	260.6	22.4	17.4	1.8	307.5	8.4	315.9
June, 1958	16.0	308.8	24.5	21.9	2.4	362.7	10.9	373.6
July, 1957	15.4	300.5	24.3	20.0	2.3	352.7	9.8	362.5

TABLE 3.—*Production of New Non-alloy and Alloy Finished Steel.*

Product.	1956.	1957.	1957.	1958.	
			June.	May.	June.
Non-alloy Steel:					
Ingots, blooms, billets and slabs[5]	4.7	5.0	4.7	4.8	3.9
Heavy rails ..	9.7	11.2	11.4	10.7	12.8
Sleepers	1.1	1.3	1.2	0.7	1.7
Fish-and sole-plates	0.7	0.8	0.4	0.6	0.9
Plates:					
(i) ⅜ in. and over	30.3	34.0	33.8	34.8	32.0
(ii) Under ⅜ in.	19.9	20.3	18.7	18.9	18.5
Other heavy prod.	50.3	53.0	54.4	49.0	44.4
Ferro-concrete bars and rods ..	7.8	8.8	9.4	8.1	8.3
Wire rods	22.9	23.3	23.2	19.7	21.0
Arches, etc. ..	10.1	11.0	11.7	9.8	8.4
Other light sections	41.4	38.8	37.0	27.3	27.9
Bright steel bars ..	8.0	7.0	7.0	6.3	6.3
Hot-rolled strip ..	24.5	23.1	21.4	21.6	23.2
Cold-rolled strip ..	7.5	7.1	6.6	6.6	7.0
Sheets, incl. coated:					
(i) Hot rolled ..	15.0	13.0	11.9	10.1	10.8
(ii) Cold reduced	24.8	29.1	29.1	28.2	31.8
Tin and terneplate	15.9	18.8	18.8	19.2	20.3
Blackplate ..	1.3	1.0	0.8	0.7	0.8
Tubes up to 16 in.	26.2	22.1	21.2	19.1	21.4
Tube, pipe fittings	0.5	0.5	0.5	0.3	0.4
Tyres, wheels, axles	4.6	5.1	5.1	4.9	5.6
Forgings (excl. drop)	3.0	3.1	3.4	3.1	3.0
Steel castings ..	4.5	4.6	5.1	4.1	4.9
Tool steel ..	0.3	0.3	0.4	0.2	0.3
Total	335.0	342.3	337.2	308.8	315.6
Alloy steel	17.3	17.8	17.4	18.1	18.7
Total deliveries from UK production[6] ..	352.3	360.1	354.6	326.9	334.3
Add: Imported steel	19.5	9.6	7.5	8.4	8.1
	371.8	369.7	362.1	335.3	342.4
Deduct: Intra-industry conversion[7] ..	55.2	48.1	45.6	41.1	40.2
Total deliveries, new material	316.6	321.6	316.5	294.2	302.2

TABLE 4. —*Production of Pig-iron and Ferro-alloys during July*, 1958

District.	Furnaces in blast.	Hematite.	Basic.	Foundry.	Forge.	Ferro-alloys.	Total.
Derbys, Leics., Notts., Northants, and Essex	19	—	16.5	20.2	0.2	—	36.9
Lancs (excluding N.W. Coast), Denbigh, Flints. and Cheshire ..	7	—	19.4	—	—	1.2	20.6
Yorkshire (excl. N.E. Coast and Sheffield) ..	—	—	—	—	—	—	—
Lincolnshire ..	9	—	36.5	—	—	—	36.5
North-East Coast	16	3.8	39.3	—	—	0.9	44.0
Scotland	7	0.5	15.4	1.3	—	—	17.2
Staffs., Shropshire, Worcs., and Warwicks ..	5	—	6.6	1.5	—	—	8.1
S. Wales and Mon.	11	3.3	45.7	—	—	—	49.0
Sheffield	2	—	2.5	—	—	—	2.5
North-West Coast	4	11.3	—	—	—	0.9	12.2
Total ..	80	18.9	181.9	23.0	0.2	3.0	227.0
June, 1958 ..	88	23.7	193.4	22.0	0.6	3.5	243.2
July, 1957[4] ..	98	28.4	208.5	22.9	0.4	3.2	263.4

[1] Used in non-food manufacturing industries.

[2] Weekly average of calendar month.

[3] Stocks, mainly ingots and sem-finished, at the end of the year and months shown.

[4] Five weeks, all tables.

[5] Other than for conversion into any other form of finished steel listed.

[6] Includes finished steel produced in the UK from imported ingots and semi-finished steel.

[7] Material for conversion into other products also listed in this table.

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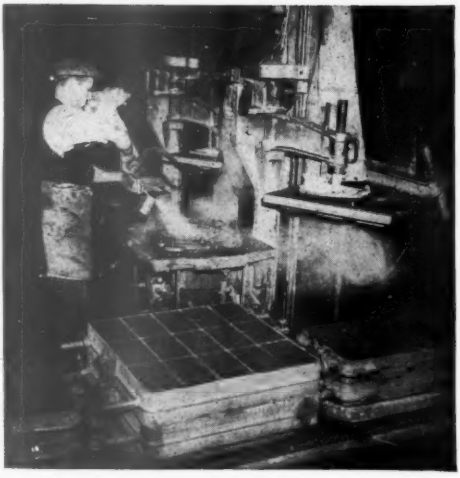

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New Catalogues

Blowgun and Sprayer. Foundry Suppliers, Limited, 25a, Cockspur Street, London, S.W.1, have issued a leaflet to illustrate by line drawing and pictures a blow-gun, carrying a spraying attachment. It is claimed that it prevents wastage of compressed air.

Compensating Cables for Pyrometry. Mersey Cable Works, Limited, Linacre Lane, Bootle, Liverpool, 20, have issued a four-page leaflet covering five categories of compensating cables for use in pyrometry, each of which is described in terms of physical construction, overall diameters in inches and approximate weight per 1,000 yards; choice of conductors and insulation are also set out.

Print-glazing Machines. Two catalogues covering this subject have been released by Kodak, Limited, Kingsway, London, W.C.2. One covers model 24, which is designed for high-production working and is actuated by a fractional-horse-power motor. The second one also covers this model but includes details about a smaller production model, 15TC, with a capacity of 500 to 600 prints per hour, and a flat-bed glazer, model 2.

Double-end Grinders. A six-page folder has been issued by Molineux Foundry Equipment, Limited, Marlborough Works, Marlborough Road, London, N.19, covering a range—four sizes—of Hilltop grinders. They are offered with dust-control systems of either the British Cast Iron Research Association's design or that of the British Steel Castings Research Association. A feature of the machines is that the two wheels can be run at different speeds and changes in the one can be effected whilst the second wheel is running. The range goes from 20- to 30-in. wheel diameter. The reviewer was pleased to see the figures given in both English and metric units of measurement.

Castable Refractory. The Silbond Refractory Manufacturing Company, 29, Crofton Avenue, Sheffield, 6, in a four-page leaflet announce that the company has discontinued selling Silbonda W/S and has replaced it by Silroc. This is made up from 95 per cent. pre-calcined materials. A note as to its preparation is in line with modern practice—that is, it is mixed dry first. There is a recommendation that the packing density in applying the material should be 90 lb. per cub. ft., but it is difficult to see how this is to be regulated in practice. Other directions given are also not too clear. There is a statement that the safe-working temperature is from 1,400 to 1,720 deg. C.

Foundry Sand Binders. A loose-leaf catalogue issued by Wm. Aske and Company, Limited, Victoria Works, Waterside, Halifax, devotes the major part of its contents to materials for CO_2 foundry practice. An extensive plant has been installed for the making of binding material which they have called Gasbinda X 5. This is turning out three 45-gallon drums every 2¼ minutes. Drum sizes and weights are given in both English and metric measures. Rightly, acknowledgment is given to Poulson and Hargreaves for their pioneer work on the CO_2 practice, and thereafter there is a short account of the actual large-scale manufacture of the binder, which is so compounded as to give easy breakdown of the sand after casting up the mould and other properties. The final page carries portraits of the various representatives of the firm.

Increases in Capital

AUTOMATIC PRESSINGS, LIMITED, Blackheath (Staffs), increased by £59,000, in £1 ordinary shares, beyond the registered capital of £1,000.

FROME TOOL & GAUGE, LIMITED, Frome (Somerset), increased by £12,000, in £1 ordinary shares, beyond the registered capital of £8,000.

TALBOT TOOL COMPANY, LIMITED, London, W.C.2, increased by £11,500, in £1 ordinary shares, beyond the registered capital of £13,500.

MINERALS SEPARATION, LIMITED, London, E.C.4, increased by £500,000, in 5s. unclassified shares, beyond the registered capital of £1,000,000.

MACMILLAN FOUNDRIES, LIMITED, Watford (Herts), increased by £10,000, in 1s. ordinary shares, beyond the registered capital of £10,000.

BRITISH ROLLING MILLS, LIMITED, Tipton (Staffs), increased by £150,000, in £1 ordinary shares, beyond the registered capital of £250,000.

GULLICK, LIMITED, machinery manufacturers, etc., of Wigan, increased by £175,000, in £1 ordinary shares, beyond the registered capital of £25,000.

PULSOMETER ENGINEERING COMPANY, LIMITED, London, W.C.1, increased by £250,000, in 5s. ordinary shares, beyond the registered capital of £750,000.

FOLLSAIN-WYCLIFFE FOUNDRIES, LIMITED, Lutterworth, near Rugby, increased by £20,000, in 4s. ordinary shares, beyond the registered capital of £150,000.

K.D.G. INSTRUMENTS, LIMITED, London, E.C.1, increased by £10,000, in £1 shares, beyond the registered capital of £5,000.

SPANNOR BOILERS, LIMITED, Bracknell (Berks), increased by £90,000, in £1 ordinary shares, beyond the registered capital of £10,000.

UNIVERSAL GRINDING WHEEL COMPANY, LIMITED, Stafford increased by £800,000, in 5s. shares, beyond the registered capital of £1,200,000.

BROCKMOOR FOUNDRY COMPANY, LIMITED, Brierley Hill (Staffs), increased by £58,500, in £1 ordinary shares, beyond the registered capital of £1,500.

FERRY-DIAMOND ENGINEERING COMPANY, LIMITED, London, E.C.2, increased by £30,000, in £1 ordinary shares, beyond the registered capital of £20,000.

SHEFFIELD TWIST DRILL & STEEL COMPANY, LIMITED, Sheffield, increased by £700,000, in 4s. ordinary shares, beyond the registered capital of £800,000.

Non-ferrous Metals (*contd. from p.* 362)

problem is can the buffer stock manager continue to buy metal at its present price and, if so, for how long? It may well be that the difficulties witnessed in connection with the international tin scheme have been taken as an object lesson by those who would have liked to introduce commodity schemes for other metals.

Lead continues dull. The future depends largely on what President Eisenhower intends doing concerning the imposition of tariffs. In the meantime, the UK price is again drifting downwards, while, in the US, the quotation continues to be held at 10½ cents a pound. Zinc, like lead, is a quiet market although, on balance, the price is holding better. The outlook is also better if the US steel industry continues its improvement and the new automobiles now on view to the American public triggers off any resurgence of demand. The US price is still called 10 cents a pound. It is understood that India is inquiring for 2,000 tons of g.o.b. metal.

Governments of countries trading in lead and zinc are to be asked to consider suggestions that production and export of the metals should be reduced. Deciding this at last week's meetings in London, convened by the United Nations Secretary-General, delegates of 31 countries agreed to approach their governments with proposals that the general level of exports of both lead and zinc ores, concentrates, and metal should be reduced for a temporary period of one year or less, that machinery should be set up for a prompt review of the situation, with both consumers and producers represented, that world mine and smelter output should be reduced, and that a study group to examine long-term problems affecting the two metals should be appointed.